A MAGNETIC SURVEY OF THE SPATIAL CHANGES IN THE EARTH'S MAGNETIC FIELD CAUSED BY FERROMAGNETIC PIPES IN FRANKLIN COUNTY, OHIO

A Senior Thesis

Presented in Partial Fulfillment of the Requirements
for the Degree Bachelor of Science

by

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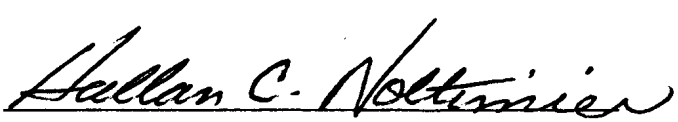
The Ohio State University
1981

Approved by



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ACKNOWLEDGEMENTS

I would like to thank my thesis adviser Dr. Hallan C. Noltimier for his assistance during the course of this project and for suggesting the topic of this investigation. I also appreciate advice given by my faculty adviser Dr. Sydney E. White.

I want to thank Arthur Eberle for his cooperation and technical information. I also would like to thank the Columbia Gas System Services Corporation for allowing me to complete magnetic surveying work on their property.

I would like to thank Dr. John Young for providing a map showing the ferromagnetic pipe specifications and locations.

I also appreicate the aid given by Dr. Peter Bohley and thank him for allowing me to do magnetic surveying in the field north of the Electroscience Laboratory.

I would also like to thank the Geology Librarians, Marge Tibbetts and Regina Brown for their consistent assistance in the circulating of library materials.

I would like to thank Scarlett Rye for typing the transcript draft.

I would like to thank Connie Armstrong and Trudy Cozad for typing this transcript.

I would like to thank Dr. Kenneth Jezek and Robert Bartman for allowing me to attend their lectures on geomagnetism.

I am deeply grateful for the enormous amount of help given to me by the members of my family during my academic career. I would like to thank my father Ralph M. White, my mother Evelyn M. White, my sister Elaine W. Chapman, and my grandmother Emma E. Brown.

I would also like to thank all of my previous teachers.

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ABSTRACT

A geophysical survey was conducted in Franklin County, Ohio of the earth's total magnetic field. The instrument used in the field work was a proton precession magnetometer. Buried ferromagnetic cylindrical pipes are located at the two areas at which the magnetic survey was conducted.

The magnetic anomalies caused by cylindrical pipes frequently serve as models for more complex perturbations of the earth's magnetic field. This would include geological structures such as anticlines and dikes.

My survey is concerned with the spatial variations in the earth's magnetic field caused by ferromagnetic pipes. Therefore, the observed field data was reduced to compensate for diurnal variation. The reduction was completed prior to constructing the magnetic profiles and the total magnetic field contour maps.

PURPOSE OF INVESTIGATION

The purpose of this investigation was to gather geophysical data of the earth's total magnetic field over buried ferromagnetic pipes, then to interpret the graphical representation of this data. In particular, I wanted to determine the spatial variation in the earth's total magnetic field caused by ferromagnetic pipes of different sizes, buried at different depths and at different locations.

INTRODUCTION

A surface magnetic survey was completed at two different areas. The initial magnetic survey was carried out on the property of the Columbia Gas Corporation (see Figure 1 for a map of the Columbia Gas Area).

A ferromagnetic pipe of the type API 4L low carbon steel is buried at this site at a depth of between three and four feet. Figure 1 shows three circled points at the surface of the land below which the pipe occurs, as determined by Arthur Eberle. The pipe has a 1/4 inch wall thickness and a 6-inch diameter.

The purpose of the initial magnetic survey was to develop my magnetic surveying skills and understanding of magnetic anomaly signatures prior to surveying the principal area.

The principal area of the magnetic survey occurred in the field north of the Electroscience Laboratory of the Ohio State University (see Figure 2 for a map of the field north of the Electroscience Laboratory). At this site the Columbia Gas System Service Corporation buried a set of 12 ferromagnetic pipes. This originally was done in order to have faculty researchers of the Ohio State University test the potential applications of using radar in detecting and locating these pipes.

I was able to secure permission to use this site for doing a magnetic survey.

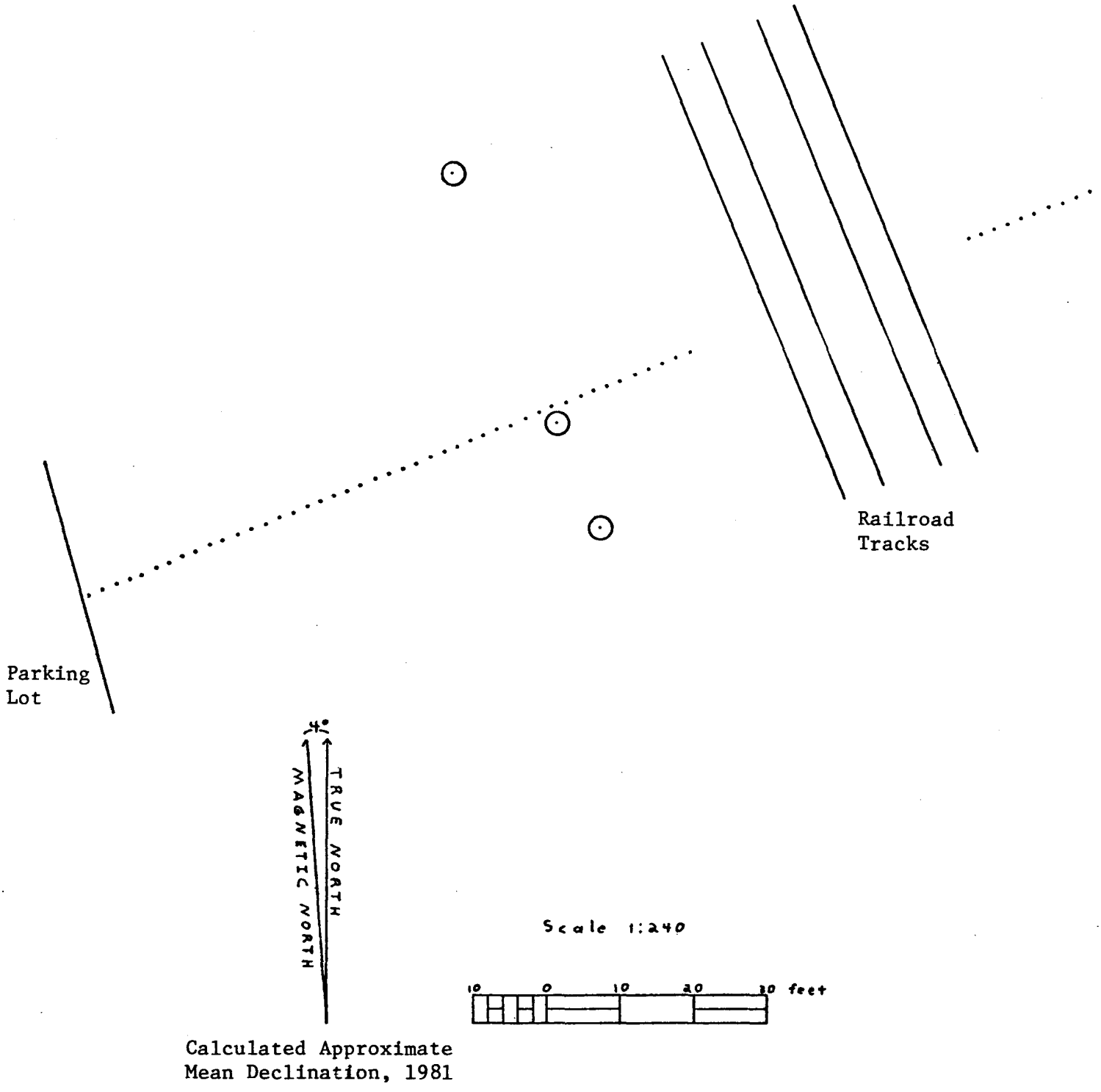


Figure 1. Map of the Columbia Gas Area.

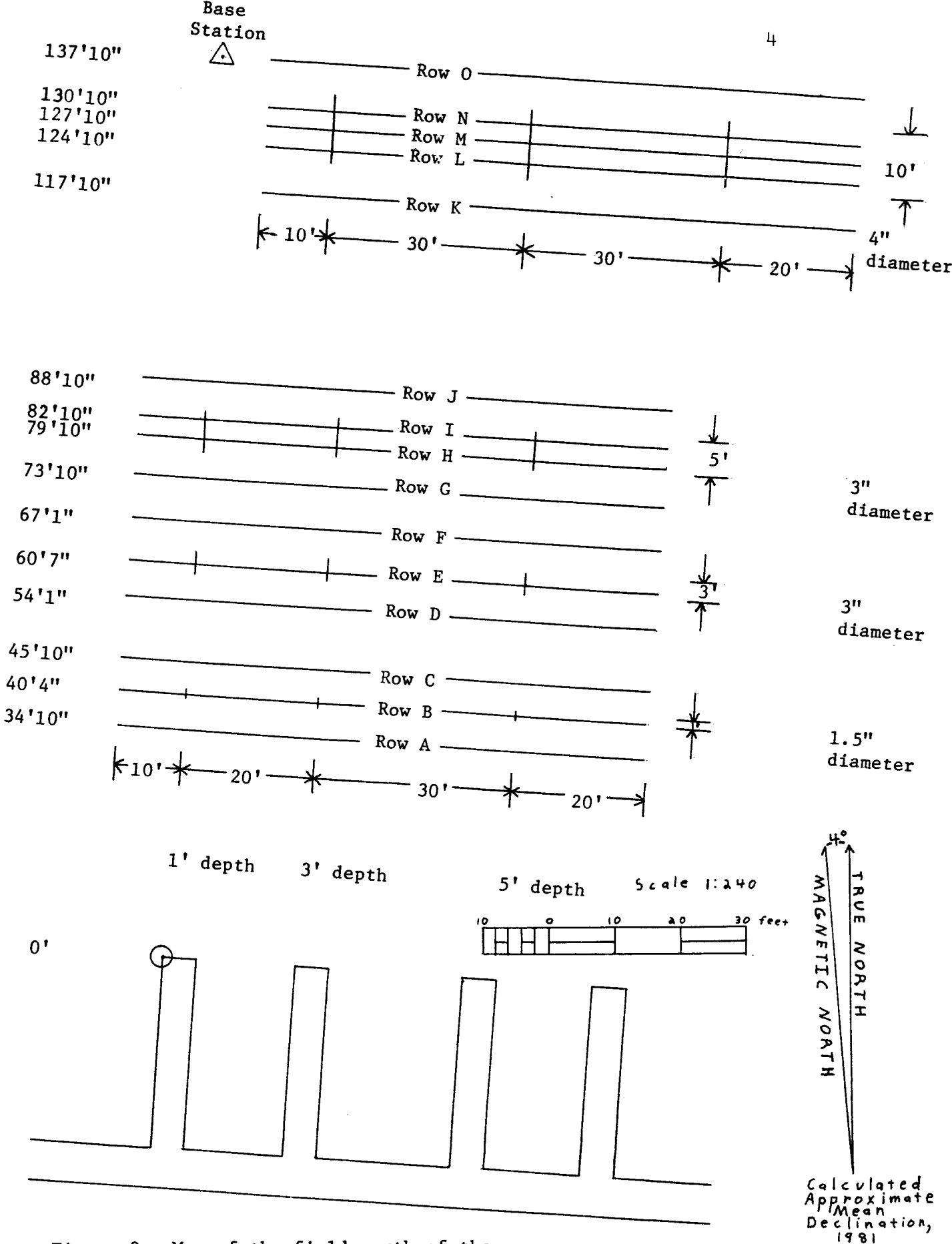


Figure 2. Map of the field north of the Electroscience Laboratory.

As indicated on Figure 2 the pipes are buried at the depths of 1-foot, 3-feet, and 5-feet. The three pipes of 1-foot length have a diameter of 1.5 inches. The three pipes of 3-foot length have a diameter of 3 inches as do the three 5-foot length pipes. The three 10-foot length pipes have a diameter of 4 inches. All twelve buried pipes have a wall thickness of 0.154 inches.

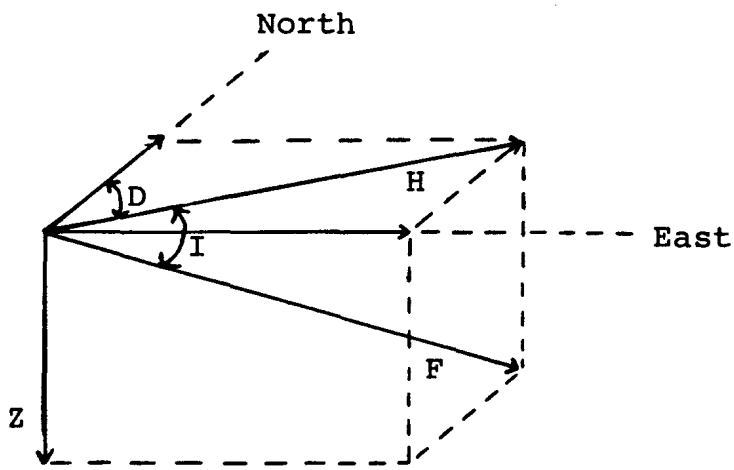
MAGNETIC THEORY

...all magnetic effects come about as a result of the relative motion of electric charges (Sears, Zamansky and Young, 1977). The origin of the (earth's magnetic) field is not well understood, but thought to be due to currents in a fluid conductive core (Breiner, 1973).

The magnetic poles of the earth do not correspond to the geographic poles of the axis of rotation. By convention, the earth's south magnetic pole is called the north magnetic pole because it is the magnetic pole closest to the north geographic pole. The north magnetic pole is located on the Boothia peninsula of Canada. The south magnetic pole is located on South Victoria Land Antarctica.

The earth's magnetic field is not symmetrical about its magnetic poles, but for simplicity can be compared to the magnetic field of a bar magnet. Like a bar magnet, the earth's magnetic field intensity is twice as large in the polar region as in the equatorial region. Similarly, like a bar magnet, the geomagnetic inclination is 90° at the north and south magnetic poles and 0° at the magnetic equator.

The components of the earth's magnetic field are called magnetic elements, these are shown in Figure 3. The magnetic elements are not constant but vary with time and location.



F = the actual magnetic field
H = the horizontal projection of F
I = the inclination
D = the declination
Z = the vertical projection of F

Figure 3. The magnetic elements of the Earth's magnetic field. (From Dobrin, 1976)

Time variation in the earth's magnetism includes the secular variation which result in slow changes in the magnetic elements. Secular variation takes place over a few years to many thousands of years. A smaller annual variation takes place as does a diurnal variation. In addition, there are magnetic storms which have varying periods. These are thought to be caused by ejected electrons and protons from the sun colliding with gas particles of the ionisphere. The smallest time variation is the micropulsation. Micropulsations have periods which range from 0.01 seconds to tens of minutes.

Variation in the earth's magnetism are also due to spatial changes. These spatial changes are due to either naturally occuring or man-made substances. Objects differ in their magnetization which results in magnetic contrast between various objects at different locations. The magnetization is of two kinds: induced and permanent. Induced magnetization, which is also called polarization for a given object, has its magnitude and direction determined entirely by the magnitude and direction of the present magnetic field of the earth. When the earth's magnetic field changes so does the induced magnetization of an object. Permanent magnetization depends upon the metallurgical properties and the thermal, mechanical and magnetic history of the specimen, and is independent of the field in which it is measured (Breiner, 1973). Permanent magnetization

becomes fixed in a ferromagnetic object after the material is cooled below the Curie point. For ferromagnetic pipes the permanent magnetization often predominates over the induced magnetization. In most instances the induced and permanent magnetization differ in both magnitude and direction. It is the vector sum of the two magnetizations that contribute to the resultant magnetic field of the object. When the magnetization of an object differ from that of its surroundings, the contrast in magnetic field can be detected and measured by using a magnetometer.

The proton precession magnetometer measures the magnitude of the resultant vector of the earth's magnetic field and that of the source's magnetic field. Since the resultant total field is almost parallel to the earth's ambient field, that which is measured is nearly equivalent to measuring the component of the anomaly parallel to the earth's ambient field.

...there are an infinite number of possible sources which can produce a given anomaly (Breiner, 1973). Subjective information about the area in which a magnetic survey is undertaken allows for a narrowing down of the possible reasons for a given set of total magnetic field readings. This greatly increases the probability for a correct interpretation of a given anomaly.

THE PROTON PRECESSION MAGNETOMETER AND ITS OPERATING PRINCIPALS

The proton precession magnetometer used for this survey was a Barringer Research Ground Magnetometer model GM-122, (specifications for this magnetometer are given in Figure 4). The magnetometer system is comprised of a magnetometer console, omnidirectional toroidal sensor, retractile cord, staff, and carrying harness. The magnetometer console is connected to the retractile cord. The staff is fastened to the sensor. The magnetometer console is connected by clips to the carrying harness which is worn over the operator's shoulder.

The sensor of the magnetometer contains kerosene and this provides an abundant proton source. The protons may be considered as minute magnets in the shape of spheres spinning about their magnetic axis. When the kerosene is placed in an external field, the system has angular momentum and a torque caused by the interaction between the proton magnetic moment and the external field. Upon depressing the pushbutton of the console, a uniform magnetic field is generated by a current in a coil of wire in the sensor. This causes the magnetic moment of the protons to become polarized in the new direction of the resultant vector of the polarizing magnetic field and the earth's magnetic field. The magnetic moments of the protons approach the

SPECIFICATIONS

Range:	20,000 to 99,999 in ranges
Accuracy:	± 1 γ through operating temperature range
Sensitivity:	1 γ
Gradient Tolerance:	600 γ/ft.
Power:	12 "D" cells
Power Consumption:	< 50 Joules (Wsec) per reading
Polarizing Power:	0.8 A @ 13.5 V for 1.5 sec. (3 second cycle) 0.8 A @ 13.5 V for 3 sec. (6 second cycle)
Number of Readings with 1 Battery Set:	2,000 - 10,000 depending on type of batteries
Frequency of Readings:	1 every 3 seconds 1 every 6 seconds
Controls:	Pushbutton switch Range Selection switch - Slide switch for 3 and 6 sec. located on P/C Board
Output:	5 digit incandescent filament readout
Indicators:	LED point Lock Indicator - last three digits of the display blanked off when phaselock not achieved Segment Function Indicator - all segments light up to permit visual inspection of the display function

Figure 4. Specifications of the Barringer Research Ground Magnetometer model GM-122. (From Barringer Research Limited, operation manual).

Mechanical:

Instrument:	Dimensions	- 7" X 3.5" X 11" (18 cm X 9 cm X 28 cm)
	Weight	- 8 lbs (3.6 kg) including batteries
Sensor:		Omnidirectional noise cancelling toroidal sensing head
	Dimensions	- 4 7/8" (12 cm) diameter - 4 3/8" (11 cm) height
	Weight	- 3 lbs (1.4 kg)
Ambient Conditions:		Operating Temperature Range - -40°F to 131°F (-40°C to 55°C)
		Relative Humidity - 0 to 100%
Environmental:		Instrument and sensor case made of high impact plastic

Figure 4 continuation. Specifications of the Barringer Research Ground Magnetometer model GM-122. (From Barringer Research Limited, operation manual).

resultant vector of the polarizing magnetic field and the earth's magnetic field. The magnetic moments of the protons approach the resultant field direction exponentially, in about three seconds. When the polarizing current is suddenly removed, the protons will precess about the earth's magnetic field. The precessing protons induce a small electromotive force (e.m.f.) in the same coil used to polarize them. This e.m.f. will have the same frequency as that of the precessing protons, and this frequency of precession is directly related to the intensity of the earth's magnetic field. The magnetometer digitizes the signal and counts this frequency and multiplies it by the proton gyromagnetic ratio, $2.6751987\ (75) \times 10^{8}\ S^{-1}\ T^{-1}$, and then displays the numerical results by light emiting diode (L.E.D.) in a five-digit readout in units of gammas.

MAGNETIC SURVEYING PROCEDURES AND TECHNIQUES AT THE INITIAL AREA OF SURVEY

The initial survey area was undertaken on the property of Columbia Gas System Corporation. At this site is a buried 6-inch diameter pipeline. As Figure 1 shows, the direction of the pipeline is nearly parallel to the adjacent railroad tracks.

A linear magnetic traverse, designated as Row W, was made perpendicular to the longest axis of the pipeline. This was done in order to obtain the maximum variation in amplitude of the magnetic profile of Row W.

The station spacing used for Row W was 2 feet. For this initial survey it was necessary to return two times and take more station readings beyond the preliminary station readings. This resulted in the 55 station positions as shown by Figure 1.

The position of the first station (W1) is 3 inches eastward of the eastern edge of the parking lot curb. The number assigned to each station of Row W increases eastward with the last station (W55) located 147 feet 3 inches eastward of the eastern edge of the parking lot curb. At each station three readings were taken in order to average the time variations at each location.

A 100-foot metal tape was used in measuring the station positions. The technique chosen to designate each station

was to place a wooden golf tee at each ground station position. The golf tees proved very suitable as marker indicators, because many light weight golf tees could be easily transported in a sack, accurately and quickly positioned in the ground, rapidly located in the low grass, and their wooden composition did not affect the magnetic field readings of the magnetometer.

On April 14, 1981, eleven stations positions were used. The first station number was later revised in the survey and is designated as base station W30 and the eleventh station was revised and is now designated as W40. At each station three magnetic field readings measured in gammas were taken.

Each station reading corresponds with its individual trial number. The three readings at each station were taken to average out the short time variations in order to give the mean of the station reading. The station range of each station was calculated by subtracting the lowest value of three readings at a given station from the highest value of the three readings at a given station. The mean of the station reading for station W30, [55990] gammas is used as the mean reference reading for Row W.

At the end of the traverse on April 14, 1981, station W30 was reoccupied and gave a mean of station reading of 55985 gammas. Since this only differs by 5 gammas, no mean of station reading corrected for drift within a traverse was used.

On April 18, 1981, ten stations positions were used. The first station used was later revised in the survey and is now designated as W25, and the tenth station used was later revised in the survey and is now designated as W45.

On April 18, 1981, station W30 was reoccupied and gave a mean of the station reading of 56081 gammas. So the mean of the station reading on April 18, 1981 increased by 91 gammas. In order to adjust for the drift between traverses, 91 gammas was subtracted from each of the mean of station readings taken on April 18, 1981. This resulted in the mean of station reading adjusted for drift between traverses.

At the end of the traverse on April 18, 1981, the station W25 was reoccupied and gave a mean of station reading of 56038 gammas, this differed from the initial reading of 56050 by 12 gammas. Since this was not outside the maximum station range of 12 gammas for a mean of station reading taken on April 18, 1981, no mean of station reading corrected for drift within a traverse was used.

On April 26, 1981, thirty-four station positions were used. The first station used is designated as W1 and the thirty-fourth station used is designated as W55. The first station occupied on April 26, 1981 was designated as W46, the last station occupied for the traverse was W1.

The reason the station positions and their designated station numbers do not correspond numerically is because during the completion of the magnetic survey of Row W

stations were added from both sides of the original eleven stations. The revised station names were used for the purpose of having an orderly numerical increase for the station names for the eastern-most station to the western-most station as shown by Figure 1.

Reoccupying the base station on April 26, 1981, gave a mean of station reading of 56094 gammas, which is 104 gammas greater than the reference mean station reading. In order to adjust for drift between this traverse and the traverse of April 14, 1981, 104 gammas was subtracted from each mean of station reading to obtain the mean of station reading adjusted for drift between traverses.

At the end of the traverse of April 26, 1981, the base station was reoccupied. The mean of station reading at the base station was 56154 gammas which increased from the base station reading (56095) gammas at the beginning of the traverse by 60 gammas. In order to obtain the mean of station reading corrected for drift within a traverse, the first mean of station reading adjusted for drift between traverses on April 26, 1981 was diminished by 1 gamma, the second was diminished by 2 gammas, the third by 3 gammas. This method continues until the ninth reading, which is diminished by 10 gammas, the tenth is diminished by 12 gammas, the eleventh reading is diminished by 14 gammas, and this pattern continued to the last reading taken on April 26, 1981.

TABLE 1

MAGNETIC DATA FROM THE COLUMBIA GAS AREA

TRIAL #	STATION	READING (gammas)	STATION RANGE (gammas)	MEAN OF STATION READING (gammas)	MEAN OF STATION READING ADJUSTED FOR DRIFT BETWEEN TRAVERSES (gammas)	MEAN OF STATION READING CORRECTED FOR DRIFT WITHIN A TRAVERSE (gammas)
1	W1	56024	± 1	56024	55920	55860
2	W1	56024				
3	W1	56023				
4	W2	55995	± 2	55995	55891	55833
5	W2	55996				
6	W2	55994				
7	W3	55939	± 1	55939	55835	55779
8	W3	55939				
9	W3	55938				
10	W4	55901	± 4	55903	55799	55745
11	W4	55905				
12	W4	55904				
13	W5	55920	± 3	55921	55817	55765
14	W5	55923				
15	W5	55920				
16	W6	55962	± 5	55965	55861	55811
17	W6	55967				
18	W6	55967				
19	W7	56003	± 2	56004	55900	55852
20	W7	56003				
21	W7	56005				
22	W8	56028	± 1	56028	55924	55878
23	W8	56029				
24	W8	56028				
25	W9	56042	± 1	56043	55939	55895
26	W9	56043				
27	W9	56043				
28	W10	56046	± 4	56048	55944	55902
29	W10	56049				
30	W10	56050				
31	W11	56051	± 2	56050	55946	55906
32	W11	56050				
33	W11	56049				

TABLE 1

MAGNETIC DATA FROM THE COLUMBIA GAS AREA

TRIAL #	STATION	READING (gammas)	STATION RANGE (gammas)	MEAN OF STATION READING (gammas)	MEAN OF STATION READING ADJUSTED FOR DRIFT BETWEEN TRAVERSES (gammas)	MEAN OF STATION READING CORRECTED FOR DRIFT WITHIN A TRAVERSE (gammas)
34	W12	56053	± 1	56054	55950	55912
35	W12	56054				
36	W12	56054				
37	W13	56054	± 1	56055	55951	55915
38	W13	56055				
39	W13	56055				
40	W14	56059	± 2	56059	55955	55921
41	W14	56060				
42	W14	56058				
43	W15	56068	± 3	56066	55962	55930
44	W15	56065				
45	W15	56065				
46	W16	56070	± 1	56071	55967	55937
47	W16	56071				
48	W16	56071				
49	W17	56074	± 3	56076	55972	55944
50	W17	56077				
51	W17	56076				
52	W18	56078	± 1	56078	55974	55948
53	W18	56077				
54	W18	56078				
55	W19	56079	± 1	56080	55976	55952
56	W19	56080				
57	W19	56080				
58	W20	56081	± 2	56082	55978	55963
59	W20	56083				
60	W20	56082				
61	W21	56066	± 3	56067	55963	55946
62	W21	56067				
63	W21	56069				
64	W22	56072	± 2	56071	55967	55949
65	W22	56070				
66	W22	56070				

TABLE 1

MAGNETIC DATA FROM THE COLUMBIA GAS AREA

TRIAL #	STATION	READING (gammas)	STATION RANGE (gammas)	MEAN OF STATION READING (gammas)	MEAN OF STATION READING ADJUSTED FOR DRIFT BETWEEN TRAVERSES (gammas)	MEAN OF STATION READING CORRECTED FOR DRIFT WITHIN A TRAVERSE (gammas)
67	W23	56081	± 3	56081	55977	55961
68	W23	56080				
69	W23	56083				
70	W24	56086	± 2	56085	55981	55967
71	W24	56084				
72	W24	56086				
73	W25	56050	± 1	56050	55959	
74	W25	56050				
75	W25	56051				
76	W26	56055	± 0	56055	55964	
77	W26	56055				
78	W26	56055				
79	W27	56059	± 0	56059	55968	
80	W27	56059				
81	W27	56059				
82	W28	56065	± 1	56065	55974	
83	W28	56065				
84	W28	56064				
85	W29	56073	± 3	56075	55984	
86	W29	56076				
87	W29	56076				
88	W30	55991	± 2	55990		
89	W30	55989				
90	W30	55989				
91	W31	56006	± 2	56007		
92	W31	56008				
93	W31	56007				
94	W32	56003	± 4	56031		
95	W32	56031				
96	W32	56029				
97	W33	56061	± 3	56061		
98	W33	56059				
99	W33	56062				

TABLE 1

MAGNETIC DATA FROM THE COLUMBIA GAS AREA

TRIAL #	STATION	READING (gammas)	STATION RANGE (gammas)	MEAN OF STATION READING (gammas)	MEAN OF STATION READING ADJUSTED FOR DRIFT BETWEEN TRAVERSES (gammas)	MEAN OF STATION READING CORRECTED FOR DRIFT WITHIN A TRAVERSE (gammas)
100	W34	56099	± 2	56097		
101	W34	56096				
102	W34	56097				
103	W35	56129	± 1	56128		
104	W35	56128				
105	W35	56128				
106	W36	56140	± 1	56140		
107	W36	56139				
108	W36	56140				
109	W37	56120	± 6	56120		
110	W37	56123				
111	W37	56117				
112	W38	56065	± 4	56067		
113	W38	56067				
114	W38	56069				
115	W39	56006	± 7	56010		
116	W39	56011				
117	W39	56013				
118	W40	55942	± 3	55943		
119	W40	55943				
120	W40	55945				
121	W41	55971	± 4	55970	55879	
122	W41	55972				
123	W41	55968				
124	W42	55903	± 6	55900	55809	
125	W42	55900				
126	W42	55897				
127	W43	55813	± 3	55813	55722	
128	W43	55812				
129	W43	55815				
130	W44	55714	± 9	55710	55619	
131	W44	55711				
132	W44	55705				

TABLE 1

MAGNETIC DATA FROM THE COLUMBIA GAS AREA

TRIAL #	STATION	READING (gammas)	STATION RANGE (gammas)	MEAN OF STATION READING (gammas)	MEAN OF STATION READING ADJUSTED FOR DRIFT BETWEEN TRAVERSES (gammas)	MEAN OF STATION READING CORRECTED FOR DRIFT WITHIN A TRAVERSE (gammas)
133	W45	55577	± 2	55578	55487	
134	W45	55579				
135	W45	55578				
136	W46	55779	±20	55775	55671	55670
137	W46	55783				
138	W46	55763				
139	W47	55862	±12	55855	55751	55749
140	W47	55850				
141	W47	55854				
142	W48	55903	± 1	55903	55799	55796
143	W48	55904				
144	W48	55903				
145	W49	55935	± 5	55938	55834	55830
146	W49	55938				
147	W49	55940				
148	W50	55952	± 1	55952	55848	55843
149	W50	55951				
150	W50	55952				
151	W51	55967	± 2	55966	55862	55856
152	W51	55965				
153	W51	55966				
154	W52	55981	± 1	55981	55877	55870
155	W52	55981				
156	W52	55982				
157	W53	55991	± 1	55991	55887	55879
158	W53	55990				
159	W53	55991				
160	W54	56000	± 5	56001	55897	55887
161	W54	55999				
162	W54	56004				
163	W55	56007	± 1	56006	55902	55890
164	W55	56006				
165	W55	56006				

MAGNETIC SURVEY PROCEDURES AND TECHNIQUES AT THE PRINCIPAL AREA OF SURVEY

The principal magnetic survey was carried out in the field north of the Electroscience Laboratory on the property of the Ohio State University. From the experience gained from the initial surveyed area, various improved techniques were able to be implemented at the principal area of survey.

In this field are located a set of twelve ferromagnetic pipes (see Figure 2). The pipes vary in length, diameter and in the depth at which they were buried as shown by Figure 2.

At the start of this investigation an orange plastic rod was placed at the reference point adjacent to the northwestern corner of the western-most concrete walkway. This reference point is indicated on Figure 2 by a dot in a circle. From this reference point, distances were measured northward for the survey.

At the reference point, one of the ends of a kite cord was positioned by tying it to a golf tee put in the ground in front of the orange rod. By pulling on the other, northern end of the string, the taut cord could very accurately be visually lined up parallel to the west side of the western-most concrete walkway. After the cord was aligned correctly, its northern end was secured in position by tying it to a golf tee.

Along this string a 100-foot metal tape was laid down. Golf tees were then placed along the measuring tape at the chosen traverse positions. The measuring tape was then laid down further north to measure off the rest of the traverses. A similar method was used by measuring from the north-eastern edge of the eastern-most concrete walkway and golf tees were placed along the measuring tape of the chosen traverses.

The actual method used for taking readings at the principal survey area was essentially the same as that used for the initial survey area.

To take readings of the earth's total magnetic field with the ground magnetometer, the rectractile cord was connected to the sensor head of the console. Then the staff was attached to the sensor and console was snapped onto the clips of the harness belt. The harness belt was worn over my left shoulder. The range selector was set on 51 kilogamma, which corresponded to the magnetic field over both of the surveyed areas. My left hand was used to position the base of the staff at the ground station positions. To enable accurate readings to be taken the staff was held at approximately arm's length and kept steady over the desired station from the time just prior to depressing the console pushbutton, momentarily, until the five-digit readout appeared on the front of the console. My right hand was used to record each valid reading in gamma units. An invalid reading was indicated by the lock indicator only

displaying the first two digits of the five-digit readout. This occurred when the magnetometer skipped in counting the precession frequency due to a low signal to noise ratio occurring within the phaselock loop. When the lock indicator was disabled, the safety system could have been overridden by keeping the pushbutton depressed during the instrument count, which is a fraction of a second before the visual displayed readout. This technique was never used because the readings could differ considerably from the actual magnetic field at a given position, decreasing the accuracy of ± one gamma, of which the magnetometer is capable.

After three valid readings were recorded in my field notes at a given fixed station, the magnetometer was manually moved in sequence to the other stations. The magnetic field readings were taken at these other stations, using the same procedure as that described previously.

For this magnetic survey, 15 linear traverses were used. They are designated as Row A, Row B, Row C, Row D, Row E, Row F, Row G, Row H, Row I, Row J, Row K, Row L, Row M, Row N, and Row O.

The field north of the Electroscience Building was divided into two designated areas: Row A through and including Row J are in the area herein called the Southern Part; Row K through and including Row O are in the area herein called the Northern Part.

The traverses were taken in the east-west direction in order to cross the ferromagnetic pipes perpendicular to their longest axis. This enables their anomaly representation as shown by magnetic profiles to attain their maximum amplitude, which in turn enhances their visual anomaly detectability.

The spacing between stations chosen for this area was two feet. In the Southern Part, the first station for each of the ten traverses was started 10 feet west of an imaginary line going over the long axis of the three western-most pipes. The last station for each traverse in the Southern Part is 80 feet east of the first station. This is 20 feet east of an imaginary line going over the longest axis of the three eastern-most pipes.

In the Northern Part, the first station for each of the five traverses, begins 10 feet west of an imaginary line through the long axis of the western-most pipe. The last station for each traverse in the Northern Part is 90 feet east of the first station. This is 20 feet east of an imaginary line going through the long axis of the eastern-most pipe.

In this field area, 640 golf tees were hand placed at each traverse station and 2 golf tees were placed side by side to designate the base station. For each adjacent traverse, a different color of golf tees was used to aid in recognition of each Row.

At the start of each traverse three base station readings were taken, and at the end of each traverse three base station readings were taken.

The first mean of station reading, taken from the average of the three base station readings, at the start of Row A was [56109]. This mean of station reading was used as datum throughout this survey.

This survey was concerned only with the spatial variations in the earth's magnetic field cause by ferromagnetic pipes, so the time variations were considered as background interference.

In order to eliminate the drift between traverses, the mean of the base station reading at the start of each traverse after Row A, was adjusted for drift. This was obtained by adding or subtracting to the mean of the base station reading in order that it would equal the reference mean of the base station reading, [56109] gammas.

This method resulted in all the mean of station readings for: Row B increasing by 20 gammas; Row C increasing by 8 gammas; Row D increasing by 28 gammas; Row E increasing by 31 gammas; Row F increasing by 24 gammas; Row G decreasing by 7 gammas; Row H increasing by 44 gammas; Row I increasing by 56 gammas; Row J increasing by 10 gammas; Row K increasing by 35 gammas; Row L increasing by 28 gammas; Row M decreasing by 14 gammas; Row N increasing by 43 gammas; Row O decreasing by 10 gammas; in order to obtain

the mean of station reading adjusted for drift between traverses.

At each station position the time of day was recorded in order to later correct for drift within a traverse. All traverses whose mean of base station reading at the start of a traverse differed by more than 3 gammas from the mean of base station reading at the end of a traverse were corrected for drift. This was done for Row B, Row F, Row I, Row K, Row M and Row N. These six rows were time corrected. This was done by averaging out the amount by which each station was reduced according to the difference of the initial base station reading and the time of each station reading, in order that the mean of the base station reading corrected for drift would have the same value, [56109], at the start and finish of each of the traverses.

TABLE 2

MAGNETIC DATA FROM THE FIELD NORTH OF THE ELECTROSCIENCE LABORATORY

TRIAL #	STATION	DAY	HOUR	MINUTE	READING (gammas)	STATION RANGE (gammas)	MEAN OF STATION READING (gammas)	MEAN OF READING ADJUSTED FOR DRIFT BETWEEN TRAVERSES (gammas)	MEAN OF READING CORRECTED FOR DRIFT WITHIN A TRAVERSE (gammas)
	(Base)	123	17	30	56110	±1	[56109]		
	(Base)				56109				
	(Base)				56109				
1	A1	123	17	40	55882	±2	55882		
2	A1				55883				
3	A1				55881				
4	A2	123	17	41	55865	±1	55865		
5	A2				55865				
6	A2				55866				
7	A3	123	17	43	55860	±2	55861		
8	A3				55862				
9	A3				55862				
10	A4	123	17	46	55861	±1	55861		
11	A4				55861				
12	A4				55862				
13	A5	123	17	48	55864	±2	55863		
14	A5				55863				
15	A5				55862				
16	A6	123	17	50	55864	±1	55864		
17	A6				55864				
18	A6				55863				
19	A7	123	17	52	55866	±3	55867		
20	A7				55867				
21	A7				55869				

TABLE 2

MAGNETIC DATA FROM THE FIELD NORTH OF THE ELECTROSCIENCE LABORATORY

TRIAL #	STATION	DAY	HOUR	MINUTE	READING (gammas)	STATION RANGE (gammas)	MEAN OF STATION READING (gammas)	MEAN OF READING ADJUSTED FOR DRIFT BETWEEN TRAVERSES (gammas)	MEAN OF READING CORRECTED FOR DRIFT WITHIN A TRAVERSE (gammas)
22	A8	123	17	54	55870	±1	55871		
23	A8				55871				
24	A8				55871				
25	A9	123	17	56	55873	±1	55872		
26	A9				55872				
27	A9				55872				
28	A10	123	17	58	55874	±0	55874		
29	A10				55874				
30	A10				55874				
31	A11	123	18	01	55876	±0	55876		
32	A11				55876				
33	A11				55876				
34	A12	123	18	04	55877	±1	55876		
35	A12				55876				
36	A12				55876				
37	A13	123	18	07	55876	±1	55876		
38	A13				55877				
39	A13				55876				
40	A14	123	18	11	55879	±1	55878		
41	A14				55878				
42	A14				55878				
43	A15	123	18	15	55879	±1	55880		
44	A15				55880				
45	A15				55880				

TABLE 2

MAGNETIC DATA FROM THE FIELD NORTH OF THE ELECTROSCIENCE LABORATORY

TRIAL #	STATION	DAY	HOUR	MINUTE	READING (gammas)	STATION RANGE (gammas)	MEAN OF STATION READING (gammas)	MEAN OF READING ADJUSTED FOR DRIFT BETWEEN TRAVERSES (gammas)	MEAN OF READING CORRECTED FOR DRIFT WITHIN A TRAVERSE (gammas)
46	A16	123	18	17	55880	±0	55880		
47	A16				55880				
48	A16				55880				
49	A17	123	18	20	55880	±0	55880		
50	A17				55880				
51	A17				55880				
52	A18	123	18	22	55877	±2	55878		
53	A18				55878				
54	A18				55879				
55	A19	123	18	23	55878	±1	55868		
56	A19				55878				
57	A19				55877				
58	A20	123	18	25	55877	±1	55877		
59	A20				55876				
60	A20				55877				
61	A21	123	18	27	55875	±0	55875		
62	A21				55875				
63	A21				55875				
64	A22	123	18	29	55873	±0	55873		
65	A22				55873				
66	A22				55873				
67	A23	123	18	30	55871	±1	55871		
68	A23				55871				
69	A23				55870				

TABLE 2

MAGNETIC DATA FROM THE FIELD NORTH OF THE ELECTROSCIENCE LABORATORY

TRIAL #	STATION	DAY	HOUR	MINUTE	READING (gammas)	STATION RANGE (gammas)	MEAN OF STATION READING (gammas)	MEAN OF READING ADJUSTED FOR DRIFT BETWEEN TRAVERSES (gammas)	MEAN OF READING CORRECTED FOR DRIFT WITHIN A TRAVERSE (gammas)
70	A24	123	18	33	55868	±1	55868		
71	A24				55868				
72	A24				55869				
73	A25	123	18	35	55867	±0	55867		
74	A25				55867				
75	A25				55867				
76	A26	123	18	37	55865	±0	55865		
77	A26				55865				
78	A26				55865				
79	A27	123	18	39	55861	±0	55861		
80	A27				55861				
81	A27				55861				
82	A28	123	18	40	55859	±1	55858		
83	A28				55858				
84	A28				55858				
85	A29	123	18	42	55853	±1	55854		
86	A29				55854				
87	A29				55854				
88	A30	123	18	44	55851	±1	55851		
89	A30				55851				
90	A30				55850				
91	A31	123	18	46	55846	±1	55847		
92	A31				55847				
93	A31				55847				

TABLE 2

MAGNETIC DATA FROM THE FIELD NORTH OF THE ELECTROSCIENCE LABORATORY

TRIAL #	STATION	DAY	HOUR	MINUTE	READING (gammas)	STATION RANGE (gammas)	MEAN OF STATION READING (gammas)	MEAN OF READING ADJUSTED FOR DRIFT BETWEEN TRAVERSES (gammas)	MEAN OF READING CORRECTED FOR DRIFT WITHIN A TRAVERSE (gammas)
94	A32	123	18	48	55842	±0	55842		
95	A32				55842				
96	A32				55842				
97	A33	123	18	50	55837	±2	55837		
98	A33				55836				
99	A33				55838				
100	A34	123	18	51	55833	±1	55834		
101	A34				55834				
102	A34				55834				
103	A35	123	18	52	55830	±1	55831		
104	A35				55831				
105	A35				55831				
106	A36	123	18	53	55872	±0	55827		
107	A36				55827				
108	A36				55827				
109	A37	123	18	55	55823	±1	55823		
110	A37				55823				
111	A37				55822				
112	A38	123	18	56	55817	±2	55816		
113	A38				55817				
114	A38				55815				
115	A39	123	18	57	55812	±1	55811		
116	A39				55811				
117	A39				55811				

TABLE 2

MAGNETIC DATA FROM THE FIELD NORTH OF THE ELECTROSCIENCE LABORATORY

TRIAL #	STATION	DAY	HOUR	MINUTE	READING (gammas)	STATION RANGE (gammas)	MEAN OF STATION READING (gammas)	MEAN OF READING ADJUSTED FOR DRIFT BETWEEN TRAVERSES (gammas)	MEAN OF READING CORRECTED FOR DRIFT WITHIN A TRAVERSE (gammas)
118	A40	123	18	58	55806	±2	55805		
119	A40				55806				
120	A40				55804				
121	A41	123	19	00	55800	±1	55800		
122	A41				55801				
123	A41				55800				
	(Base)	123	19	03	56108	±2	56108		
	(Base)				56109				
	(Base)				56107				
	(Base)	124	15	15	56089	±1	56089	56109	56109
	(Base)				56089				
	(Base)				56090				
124	B1	124	15	20	55897	±1	55897	55917	55917
125	B1				55896				
126	B1				55897				
127	B2	124	12	22	55888	±3	55890	55910	55910
128	B2				55891				
129	B2				55890				
130	B3	124	15	25	55888	±1	55888	55908	55908
131	B3				55888				
132	B3				55889				
133	B4	124	15	27	55887	±2	55888	55908	55907
134	B4				55889				
135	B4				55889				

TABLE 2

MAGNETIC DATA FROM THE FIELD NORTH OF THE ELECTROSCIENCE LABORATORY

TRIAL #	STATION	DAY	HOUR	MINUTE	READING (gammas)	STATION RANGE (gammas)	MEAN OF STATION READING (gammas)	MEAN OF READING ADJUSTED FOR DRIFT BETWEEN TRAVERSES (gammas)	MEAN OF READING CORRECTED FOR DRIFT WITHIN A TRAVERSE (gammas)
136	B5	124	15	29	55890	$\pm$1	55889	55909	55908
137	B5				55889				
138	B5				55889				
139	B6	124	15	32	55892	$\pm$2	55891	55911	55910
140	B6				55890				
141	B6				55891				
142	B7	124	15	34	55891	$\pm$2	55890	55910	55909
143	B7				55891				
144	B7				55889				
145	B8	124	15	36	55891	$\pm$1	55891	55911	55910
146	B8				55891				
147	B8				55890				
148	B9	124	15	37	55890	$\pm$1	55890	55910	55908
149	B9				55890				
150	B9				55889				
151	B10	124	15	39	55890	$\pm$0	55890	55910	55908
152	B10				55890				
153	B10				55890				
154	B11	124	15	41	55891	$\pm$1	55891	55911	55909
155	B11				55891				
156	B11				55890				
157	B12	124	15	43	55893	$\pm$2	55892	55912	55910
158	B12				55891				
159	B12				55892				

TABLE 2

MAGNETIC DATA FROM THE FIELD NORTH OF THE ELECTROSCIENCE LABORATORY

TRIAL #	STATION	DAY	HOUR	MINUTE	READING (gammas)	STATION RANGE (gammas)	MEAN OF STATION READING (gammas)	MEAN OF READING ADJUSTED FOR DRIFT BETWEEN TRAVERSES (gammas)	MEAN OF READING CORRECTED FOR DRIFT WITHIN A TRAVERSE (gammas)
160	B13	124	15	46	55891	±0	55891	55911	55909
161	B13				55891				
162	B13				55891				
163	B14	124	15	48	55890	±1	55890	55910	55907
164	B14				55890				
165	B14				55891				
166	B15	124	15	50	55891	±2	55890	55910	55907
167	B15				55890				
168	B15				55889				
169	B16	124	15	51	55889	±2	55890	55910	55907
170	B16				55891				
171	B16				55891				
172	B17	124	15	53	55890	±1	55890	55910	55907
173	B17				55890				
174	B17				55889				
175	B18	124	15	55	55889	±0	55889	55909	55906
176	B18				55889				
177	B18				55889				
178	B19	124	15	57	55888	±1	55888	55908	55905
179	B19				55887				
180	B19				55888				
181	B20	124	15	59	55886	±1	55886	55906	55902
182	B20				55886				
183	B20				55885				

TABLE 2

MAGNETIC DATA FROM THE FIELD NORTH OF THE ELECTROSCIENCE LABORATORY

TRIAL #	STATION	DAY	HOUR	MINUTE	READING (gammas)	STATION RANGE (gammas)	MEAN OF STATION READING (gammas)	MEAN OF READING ADJUSTED FOR DRIFT BETWEEN TRAVERSES (gammas)	MEAN OF READING CORRECTED FOR DRIFT WITHIN A TRAVERSE (gammas)
184	B21	124	16	2	55885	±1	55884	55904	55900
185	B21				55884				
186	B21				55884				
187	B22	124	16	3	55882	±1	55882	55902	55898
188	B22				55882				
189	B22				55883				
190	B23	124	16	5	55880	±1	55880	55900	55896
191	B23				55880				
192	B23				55879				
193	B24	124	16	7	55877	±1	55877	55897	55894
194	B24				55878				
195	B24				55877				
196	B25	124	16	9	55874	±1	55874	55894	55890
197	B25				55875				
198	B25				55874				
199	B26	124	16	11	55871	±1	55871	55891	55886
200	B26				55872				
201	B26				55871				
202	B27	124	16	13	55869	±1	55869	55889	55884
203	B27				55869				
204	B27				55868				
205	B28	124	16	15	55865	±1	55865	55885	55880
206	B28				55865				
207	B28				55866				

TABLE 2

MAGNETIC DATA FROM THE FIELD NORTH OF THE ELECTROSCIENCE LABORATORY

TRIAL #	STATION	DAY	HOUR	MINUTE	READING (gammas)	STATION RANGE (gammas)	MEAN OF STATION READING (gammas)	MEAN OF READING ADJUSTED FOR DRIFT BETWEEN TRAVERSES (gammas)	MEAN OF READING CORRECTED FOR DRIFT WITHIN A TRAVERSE (gammas)
208	B29	124	16	17	55861	±1	55862	55882	55877
209	B29				55862				
210	B29				55862				
211	B30	124	16	19	55857	±1	55858	55878	55873
212	B30				55858				
213	B30				55858				
214	B31	124	16	22	55854	±2	55854	55874	55868
215	B31				55855				
216	B31				55853				
217	B32	124	16	24	55848	±1	55848	55868	55862
218	B32				55848				
219	B32				55849				
220	B33	124	16	26	55844	±1	55845	55865	55859
221	B33				55845				
222	B33				55845				
223	B34	124	16	27	55840	±1	55841	55861	55855
224	B34				55841				
225	B34				55841				
226	B35	124	16	30	55837	±2	55838	55858	55853
227	B35				55837				
228	B35				55839				

TABLE 2

MAGNETIC DATA FROM THE FIELD NORTH OF THE ELECTROSCIENCE LABORATORY

TRIAL #	STATION	DAY	HOUR	MINUTE	READING (gammas)	STATION RANGE (gammas)	MEAN OF STATION READING (gammas)	MEAN OF READING ADJUSTED FOR DRIFT BETWEEN TRAVERSES (gammas)	MEAN OF READING CORRECTED FOR DRIFT WITHIN A TRAVERSE (gammas)
229	B36	124	16	32	55834	±0	55834	55854	55847
230	B36				55854				
231	B36				55834				
232	B37	124	16	36	55830	±2	55829	55849	55842
233	B37				55830				
234	B37				55828				
235	B38	124	16	39	55825	±3	55824	55844	55837
236	B38				55825				
237	B38				55822				
238	B39	124	16	40	55818	±1	55818	55838	55831
239	B39				55819				
240	B39				55818				
241	B40	124	16	43	55812	±1	55813	55833	55825
242	B40				55813				
243	B40				55813				
244	B41	124	16	44	55807	±0	55807	55827	55819
245	B41				55807				
246	B41				55807				
	(Base)	124	16	45	56097	±2	56097	56117	56109
	(Base)				56096				
	(Base)				56098				

TABLE 2

MAGNETIC DATA FROM THE FIELD NORTH OF THE ELECTROSCIENCE LABORATORY

TRIAL #	STATION	DAY	HOUR	MINUTE	READING (gammas)	STATION RANGE (gammas)	MEAN OF STATION READING (gammas)	MEAN OF STATION READING ADJUSTED FOR DRIFT BETWEEN TRAVERSES (gammas)	MEAN OF STATION READING CORRECTED FOR DRIFT WITHIN A TRAVERSE (gammas)
	(Base)	124	17	15	56101	±1	56101	56109	
	(Base)				56101				
	(Base)				56100				
247	C1	124	17	17	55906	±2	55906	55914	
248	C1				55907				
249	C1				55905				
250	C2	124	17	19	55910	±1	55910	55918	
251	C2				55909				
252	C2				55910				
253	C3	124	17	20	55913	±1	55913	55921	
254	C3				55913				
255	C3				55914				
256	C4	124	17	22	55917	±0	55917	55925	
257	C4				55917				
258	C4				55917				
259	C5	124	17	24	55917	±2	55918	55926	
260	C5				55919				
261	C5				55917				
262	C6	124	17	26	55921	±1	55921	55929	
263	C6				55920				
264	C6				55921				
265	C7	124	17	27	55921	±1	55921	55929	
266	C7				55921				
267	C7				55922				
268	C8	124	17	30	55924	±1	55924	55932	
269	C8				55925				
270	C8				55924				

TABLE 2

MAGNETIC DATA FROM THE FIELD NORTH OF THE ELECTROSCIENCE LABORATORY

TRIAL #	STATION	DAY	HOUR	MINUTE	READING (gammas)	STATION RANGE (gammas)	MEAN OF STATION READING (gammas)	MEAN OF STATION READING ADJUSTED FOR DRIFT BETWEEN TRAVERSES (gammas)	MEAN OF STATION READING CORRECTED FOR DRIFT WITHIN A TRAVERSE (gammas)
271	C9	124	17	31	55927	±0	55927	55935	
272	C9				55927				
273	C9				55927				
274	C10	124	17	33	55928	±2	55929	55937	
275	C10				55930				
276	C10				55930				
277	C11	124	17	35	55931	±1	55931	55939	
278	C11				55930				
279	C11				55931				
280	C12	124	17	37	55932	±1	55933	55941	
281	C12				55933				
282	C12				55933				
283	C13	124	17	39	55935	±1	55934	55942	
284	C13				55934				
285	C13				55934				
286	C14	124	17	40	55934	±2	55935	55943	
287	C14				55936				
288	C14				55935				
289	C15	124	17	42	55936	±0	55936	55944	
290	C15				55936				
291	C15				55936				
292	C16	124	17	45	55935	±1	55936	55944	
293	C16				55936				
294	C16				55936				

TABLE 2

MAGNETIC DATA FROM THE FIELD NORTH OF THE ELECTROSCIENCE LABORATORY

TRIAL #	STATION	DAY	HOUR	MINUTE	READING (gammas)	STATION RANGE (gammas)	MEAN OF STATION READING (gammas)	MEAN OF STATION READING ADJUSTED FOR DRIFT BETWEEN TRAVERSES (gammas)	MEAN OF STATION READING CORRECTED FOR DRIFT WITHIN A TRAVERSE (gammas)
295	C17	124	17	47	55934	±2	55935	55943	
296	C17				55936				
297	C17				55934				
298	C18	124	17	50	55935	±1	55934	55942	
299	C18				55934				
300	C18				55934				
301	C19	124	17	52	55931	±0	55931	55939	
302	C19				55931				
303	C19				55931				
304	C20	124	17	54	55929	±2	55929	55937	
305	C20				55930				
306	C20				55928				
307	C21	124	17	55	55925	±1	55925	55932	
308	C21				55925				
309	C21				55926				
310	C22	124	17	58	55921	±2	55922	55930	
311	C22				55923				
312	C22				55922				
313	C23	124	18	0	55920	±1	55919	55927	
314	C23				55919				
315	C23				55919				
316	C24	124	18	1	55916	±1	55916	55924	
317	C24				55916				
318	C24				55915				

TABLE 2

MAGNETIC DATA FROM THE FIELD NORTH OF THE ELECTROSCIENCE LABORATORY

TRIAL #	STATION	DAY	HOUR	MINUTE	READING (gammas)	STATION RANGE (gammas)	MEAN OF STATION READING (gammas)	MEAN OF STATION READING ADJUSTED FOR DRIFT BETWEEN TRAVERSES (gammas)	MEAN OF STATION READING CORRECTED FOR DRIFT WITHIN A TRAVERSE (gammas)
319	C25	124	18	2	55912	±1	55912	55920	
320	C25				55911				
321	C25				55912				
322	C26	124	18	5	55908	±1	55908	55916	
323	C26				55907				
324	C26				55908				
325	C27	124	18	7	55904	±1	55904	55912	
326	C27				55903				
327	C27				55904				
328	C28	124	18	8	55899	±0	55899	55907	
329	C28				55899				
330	C28				55899				
331	C29	124	18	10	55894	±1	55894	55902	
332	C29				55894				
333	C29				55893				
334	C30	124	18	12	55888	±1	55888	55896	
335	C30				55888				
336	C30				55889				
337	C31	124	18	15	55883	±1	55882	55890	
338	C31				55882				
339	C31				55882				
340	C32	124	18	17	55880	±0	55880	55888	
341	C32				55880				
342	C32				55880				

TABLE 2

MAGNETIC DATA FROM THE FIELD NORTH OF THE ELECTROSCIENCE LABORATORY

TRIAL #	STATION	DAY	HOUR	MINUTE	READING (gammas)	STATION RANGE (gammas)	MEAN OF STATION READING (gammas)	MEAN OF READING ADJUSTED FOR DRIFT BETWEEN TRAVERSES (gammas)	MEAN OF READING CORRECTED FOR DRIFT WITHIN A TRAVERSE (gammas)
343	C33	124	18	20	55877	±1	55877	55884	
344	C33				55877				
345	C33				55876				
346	C34	124	18	21	55873	±1	55873	55881	
347	C34				55872				
348	C34				55872				
349	C35	124	18	23	55870	±3	55870	55878	
350	C35				55871				
351	C35				55868				
352	C36	124	18	24	55864	±1	55865	55873	
353	C36				55865				
354	C36				55865				
355	C37	124	18	26	55861	±2	55862	55870	
356	C37				55863				
357	C37				55863				
358	C38	124	18	27	55858	±2	55857	55865	
359	C38				55857				
360	C38				55856				
361	C39	124	18	28	55851	±1	55852	55860	
362	C39				55852				
363	C39				55852				
364	C40	124	18	30	55847	±1	55847	55856	
365	C40				55847				
366	C40				55846				

TABLE 2

MAGNETIC DATA FROM THE FIELD NORTH OF THE ELECTROSCIENCE LABORATORY

TRIAL #	STATION	DAY	HOUR	MINUTE	READING (gammas)	STATION RANGE (gammas)	MEAN OF STATION READING (gammas)	MEAN OF READING ADJUSTED FOR DRIFT BETWEEN TRAVERSES (gammas)	MEAN OF READING CORRECTED FOR DRIFT WITHIN A TRAVERSE (gammas)
367	C41	124	18	31	55841	±2	55841	55849	
368	C41				55842				
369	C41				55840				
	(Base)	124	18	35	56103	±1	56103	56111	
	(Base)				56103				
	(Base)				56102				
	(Base)	125	10	20	56081	±2	56081	56109	
	(Base)				56080				
	(Base)				56082				
370	D1	125	10	26	55939	±1	55940	55968	
371	D1				55940				
372	D1				55940				
373	D2	125	10	28	55939	±1	55939	55967	
374	D2				55939				
375	D2				55940				
376	D3	125	10	30	55941	±1	55941	55969	
377	D3				55940				
378	D3				55941				
379	D4	125	10	34	55939	±10	55936	55964	
380	D4				55930				
381	D4				55940				
382	D5	125	10	36	55935	±2	55936	55964	
383	D5				55937				
384	D5				55937				

TABLE 2

MAGNETIC DATA FROM THE FIELD NORTH OF THE ELECTROSCIENCE LABORATORY

TRIAL #	STATION	DAY	HOUR	MINUTE	READING (gammas)	STATION RANGE (gammas)	MEAN OF STATION READING (gammas)	MEAN OF READING ADJUSTED FOR DRIFT BETWEEN TRAVERSES (gammas)	MEAN OF READING CORRECTED FOR DRIFT WITHIN A TRAVERSE (gammas)
385	D6	125	10	38	55935	±1	55935	55963	
386	D6				55935				
387	D6				55934				
388	D7	125	10	41	55935	±0	55935	55963	
389	D7				55935				
390	D7				55935				
391	D8	125	10	43	55938	±2	55938	55966	
392	D8				55939				
393	D8				55937				
394	D9	125	10	45	55941	±0	55941	55969	
395	D9				55941				
396	D9				55941				
397	D10	125	10	47	55944	±1	55945	55973	
398	D10				55945				
399	D10				55945				
400	D11	125	10	50	55947	±1	55948	55976	
401	D11				55948				
402	D11				55948				
403	D12	125	10	53	55950	±1	55950	55978	
404	D12				55951				
405	D12				55950				
406	D13	125	10	56	55957	±2	55956	55984	
407	D13				55955				
408	D13				55956				

TABLE 2

MAGNETIC DATA FROM THE FIELD NORTH OF THE ELECTROSCIENCE LABORATORY

TRIAL #	STATION	DAY	HOUR	MINUTE	READING (gammas)	STATION RANGE (gammas)	MEAN OF STATION READING (gammas)	MEAN OF READING ADJUSTED FOR DRIFT BETWEEN TRAVERSES (gammas)	MEAN OF READING CORRECTED FOR DRIFT WITHIN A TRAVERSE (gammas)
409	D14	125	10	58	55962	±1	55962	55990	
410	D14				55963				
411	D14				55962				
412	D15	125	11	0	55969	±1	55968	55996	
413	D15				55968				
414	D15				55968				
415	D16	125	11	3	55971	±0	55971	55999	
416	D16				55971				
417	D16				55971				
418	D17	125	11	6	55968	±1	55969	55997	
419	D17				55969				
420	D17				55969				
421	D18	125	11	10	55961	±2	55962	55990	
422	D18				55963				
423	D18				55961				
424	D19	125	11	12	55951	±1	55952	55980	
425	D19				55952				
426	D19				55952				
427	D20	125	11	14	55943	±2	55944	55972	
428	D20				55943				
429	D20				55945				
430	D21	125	11	15	55936	±1	55935	55963	
431	D21				55935				
432	D21				55935				

TABLE 2

MAGNETIC DATA FROM THE FIELD NORTH OF THE ELECTROSCIENCE LABORATORY

TRIAL #	STATION	DAY	HOUR	MINUTE	READING (gammas)	STATION RANGE (gammas)	MEAN OF STATION READING (gammas)	MEAN OF READING ADJUSTED FOR DRIFT BETWEEN TRAVERSES (gammas)	MEAN OF READING CORRECTED FOR DRIFT WITHIN A TRAVERSE (gammas)
433	D22	125	11	18	55931	±1	55931	55959	
434	D22				55930				
435	D22				55931				
436	D22	125	11	20	55927	±2	55926	55954	
437	D23				55925				
438	D23				55925				
439	D24	125	11	22	55922	±2	55921	55949	
440	D24				55921				
441	D24				55920				
442	D25	125	11	24	55917	±1	55917	55945	
443	D25				55917				
444	D25				55918				
445	D26	125	11	26	55913	±1	55913	55941	
446	D26				55913				
447	D26				55914				
448	D27	125	11	30	55906	±2	55907	55935	
449	D27				55908				
450	D27				55908				
451	D28	125	11	32	55900	±1	55900	55928	
452	D28				55900				
453	D28				55899				
454	D29	125	11	34	55892	±1	55892	55920	
455	D29				55893				
456	D29				55892				

TABLE 2

MAGNETIC DATA FROM THE FIELD NORTH OF THE ELECTROSCIENCE LABORATORY

TRIAL #	STATION	DAY	HOUR	MINUTE	READING (gammas)	STATION RANGE (gammas)	MEAN OF STATION READING (gammas)	MEAN OF READING ADJUSTED FOR DRIFT BETWEEN TRAVERSES (gammas)	MEAN OF READING CORRECTED FOR DRIFT WITHIN A TRAVERSE (gammas)
457	D30	125	11	35	55884	±2	55883	55911	
458	D30				55883				
459	D30				55882				
460	D31	125	11	37	55877	±1	55876	55904	
461	D31				55876				
462	D31				55876				
463	D32	125	11	39	55871	±1	55872	55900	
464	D32				55872				
465	D32				55872				
466	D33	125	11	41	55871	±2	55871	55899	
467	D33				55872				
468	D33				55870				
469	D34	125	11	42	55871	±1	55871	55899	
470	D34				55871				
471	D34				55870				
472	D35	125	11	44	55871	±1	55870	55898	
473	D35				55870				
474	D35				55870				
475	D36	125	11	46	55871	±1	55870	55898	
476	D36				55870				
477	D36				55870				
478	D37	125	11	47	55867	±1	55867	55895	
479	D37				55867				
480	D37				55868				

TABLE 2

MAGNETIC DATA FROM THE FIELD NORTH OF THE ELECTROSCIENCE LABORATORY

TRIAL #	STATION	DAY	HOUR	MINUTE	READING (gammas)	STATION RANGE (gammas)	MEAN OF STATION READING (gammas)	MEAN OF READING ADJUSTED FOR DRIFT BETWEEN TRAVERSES (gammas)	MEAN OF READING CORRECTED FOR DRIFT WITHIN A TRAVERSE (gammas)
481	D38	125	11	50	55864	±1	55864	55892	
482	D38				55864				
483	D38				55865				
484	D39	125	11	51	55859	±0	55859	55887	
485	D39				55859				
486	D39				55859				
487	D40	125	11	52	55854	±1	55853	55881	
488	D40				55853				
489	D40				55853				
490	D41	125	11	54	55846	±2	55847	55875	
491	D41				55846				
492	D41				55848				
	(Base)	125	11	57	56078	±2	56078	56106	
	(Base)				56079				
	(Base)				56077				
	(Base)	125	12	30	56078	±0	56078	56109	
	(Base)				56078				
	(Base)				56078				
493	E1	125	12	35	55966	±0	55966	55997	
494	E1				55967				
495	E1				55966				
496	E2	125	12	37	55967	±1	55967	55998	
497	E2				55968				
498	E2				55967				

TABLE 2

MAGNETIC DATA FROM THE FIELD NORTH OF THE ELECTROSCIENCE LABORATORY

TRIAL #	STATION	DAY	HOUR	MINUTE	READING (gammas)	STATION RANGE (gammas)	MEAN OF STATION READING (gammas)	MEAN OF READING ADJUSTED FOR DRIFT BETWEEN TRAVERSES (gammas)	MEAN OF READING CORRECTED FOR DRIFT WITHIN A TRAVERSE (gammas)
499	E3	125	12	40	55971	$\pm$0	55971	56002	
500	E3				55971				
501	E3				55971				
502	E4	125	12	45	55978	$\pm$1	55978	56009	
503	E4				55977				
504	E4				55978				
505	E5	125	12	53	55984	$\pm$3	55983	56014	
506	E5				55984				
507	E5				55981				
508	E6	125	12	55	55991	$\pm$0	55991	56022	
509	E6				55991				
510	E6				55991				
511	E7	125	12	57	55986	$\pm$3	55987	56018	
512	E7				55989				
513	E7				55986				
514	E8	125	12	59	55976	$\pm$2	55977	56008	
515	E8				55978				
516	E8				55977				
517	E9	125	13	0	55969	$\pm$1	55970	56001	
518	E9				55970				
519	E9				55970				
520	E10	125	13	2	55965	$\pm$1	55966	55997	
521	E10				55966				
522	E10				55966				

TABLE 2

MAGNETIC DATA FROM THE FIELD NORTH OF THE ELECTROSCIENCE LABORATORY

TRIAL #	STATION	DAY	HOUR	MINUTE	READING (gammas)	STATION RANGE (gammas)	MEAN OF STATION READING (gammas)	MEAN OF READING ADJUSTED FOR DRIFT BETWEEN TRAVERSES (gammas)	MEAN OF READING CORRECTED FOR DRIFT WITHIN A TRAVERSE (gammas)
523	E11	125	13	4	55963	±1	55963	55994	
524	E11				55963				
525	E11				55962				
526	E12	125	13	7	55961	±3	55960	55991	
527	E12				55960				
528	E12				55958				
529	E13	125	13	10	55956	±2	55957	55988	
530	E13				55958				
531	E13				55956				
532	E14	125	13	12	55956	±2	55955	55986	
533	E14				55955				
534	E14				55954				
535	E15	125	13	13	55958	±1	55958	55989	
536	E15				55957				
537	E15				55958				
538	E16	125	13	15	55959	±1	55958	55989	
539	E16				55958				
540	E16				55958				
541	E17	125	13	23	55956	±1	55956	55987	
542	E17				55956				
543	E17				55957				
544	E18	125	13	25	55957	±1	55956	55987	
545	E18				55956				
546	E18				55956				

TABLE 2

MAGNETIC DATA FROM THE FIELD NORTH OF THE ELECTROSCIENCE LABORATORY

TRIAL #	STATION	DAY	HOUR	MINUTE	READING (gammas)	STATION RANGE (gammas)	MEAN OF STATION READING (gammas)	MEAN OF READING ADJUSTED FOR DRIFT BETWEEN TRAVERSES (gammas)	MEAN OF READING CORRECTED FOR DRIFT WITHIN A TRAVERSE (gammas)
547	E19	125	13	26	55954	±0	55954	55985	
548	E19				55954				
549	E19				55954				
550	E20	125	13	28	55951	±0	55951	55982	
551	E20				55951				
552	E20				55951				
553	E21	125	13	29	55948	±1	55947	55978	
554	E21				55947				
555	E21				55947				
556	E22	125	13	31	55945	±1	55945	55976	
557	E22				55945				
558	E22				55944				
559	E23	125	13	33	55941	±1	55942	55973	
560	E23				55942				
561	E23				55942				
562	E24	125	13	35	55939	±1	55939	55970	
563	E24				55940				
564	E24				55939				
565	E25	125	13	36	55937	±1	55937	55968	
566	E25				55938				
567	E25				55937				
568	E26	125	13	37	55936	±1	55936	55967	
569	E26				55936				
570	E26				55935				

TABLE 2

MAGNETIC DATA FROM THE FIELD NORTH OF THE ELECTROSCIENCE LABORATORY

TRIAL #	STATION	DAY	HOUR	MINUTE	READING (gammas)	STATION RANGE (gammas)	MEAN OF STATION READING (gammas)	MEAN OF READING ADJUSTED FOR DRIFT BETWEEN TRAVERSES (gammas)	MEAN OF READING CORRECTED FOR DRIFT WITHIN A TRAVERSE (gammas)
571	E27	125	13	41	55936	±2	55935	55966	
572	E27				55934				
573	E27				55936				
574	E28	125	13	44	55937	±2	55936	55967	
575	E28				55935				
576	E28				55935				
577	E29	125	13	46	55936	±2	55937	55968	
578	E29				55938				
579	E29				55938				
580	E30	125	13	47	55935	±2	55936	55967	
581	E30				55936				
582	E30				55937				
583	E31	125	13	49	55933	±1	55933	55964	
584	E31				55934				
585	E31				55933				
586	E32	125	13	51	55932	±1	55932	55963	
587	E32				55931				
588	E32				55932				
589	E33	125	13	53	55923	±5	55925	55956	
590	E33				55924				
591	E33				55928				
592	E34	125	13	55	55917	±3	55918	55949	
593	E34				55918				
594	E34				55920				

TABLE 2

MAGNETIC DATA FROM THE FIELD NORTH OF THE ELECTROSCIENCE LABORATORY

TRIAL #	STATION	DAY	HOUR	MINUTE	READING (gammas)	STATION RANGE (gammas)	MEAN OF STATION READING (gammas)	MEAN OF READING ADJUSTED FOR DRIFT BETWEEN TRAVERSES (gammas)	MEAN OF READING CORRECTED FOR DRIFT WITHIN A TRAVERSE (gammas)
594	E35	125	13	57	55912	±1	55912	55943	
595	E35				55913				
596	E35				55912				
597	E36	125	13	58	55905	±2	55905	55936	
598	E36				55906				
599	E36				55904				
600	E37	125	14	1	55897	±0	55897	55928	
601	E37				55897				
602	E37				55897				
603	E38	125	14	2	55890	±1	55890	55921	
604	E38				55890				
605	E38				55891				
606	E39	125	14	3	55882	±1	55883	55914	
607	E39				55883				
608	E39				55883				
609	E40	125	14	4	55876	±2	55876	55907	
610	E40				55877				
611	E40				55875				
612	E41	125	14	5	55871	±0	55871	55902	
613	E41				55871				
614	E41				55871				
	(Base)	125	14	7	56079	±1	56079	56110	
	(Base)				56078				
	(Base)				56079				

TABLE 2

MAGNETIC DATA FROM THE FIELD NORTH OF THE ELECTROSCIENCE LABORATORY

TRIAL #	STATION	DAY	HOUR	MINUTE	READING (gammas)	STATION RANGE (gammas)	MEAN OF STATION READING (gammas)	MEAN OF READING ADJUSTED FOR DRIFT BETWEEN TRAVERSES (gammas)	MEAN OF READING CORRECTED FOR DRIFT WITHIN A TRAVERSE (gammas)
	(Base)	126	15	15	56085	±1	56085	56109	56109
	(Base)				56086				
	(Base				56085				
616	F1	126	15	17	56004	±2	56003	56027	56027
617	F1				56003				
618	F1				56002				
619	F2	126	15	19	56008	±1	56008	56032	56032
620	F2				56007				
621	F2				56008				
622	F3	126	15	21	56015	±1	56015	56039	56039
623	F3				56014				
624	F3				56015				
625	F4	126	15	22	56024	±1	56024	56048	56048
626	F4				56025				
627	F4				56024				
628	F5	126	15	25	56033	±1	56034	56058	56057
629	F5				56034				
630	F5				56034				
631	F6	126	15	26	56037	±2	56037	56061	56060
632	F6				56038				
633	F6				56036				
634	F7	126	15	28	56036	±1	56035	56059	56058
635	F7				56035				
636	F7				56035				

TABLE 2

MAGNETIC DATA FROM THE FIELD NORTH OF THE ELECTROSCIENCE LABORATORY

TRIAL #	STATION	DAY	HOUR	MINUTE	READING (gammas)	STATION RANGE (gammas)	MEAN OF STATION READING (gammas)	MEAN OF READING ADJUSTED FOR DRIFT BETWEEN TRAVERSES (gammas)	MEAN OF READING CORRECTED FOR DRIFT WITHIN A TRAVERSE (gammas)
637	F8	126	15	30	56027	±1	56027	56051	56050
638	F8				56027				
639	F8				56028				
640	F9	126	15	32	56019	±3	56019	56043	56041
641	F9				56017				
642	F9				56020				
643	F10	126	15	34	56011	±1	56011	56035	56033
644	F10				56010				
645	F10				56011				
646	F11	126	15	36	56004	±3	56006	56030	56028
647	F11				56007				
648	F11				56006				
649	F12	126	15	37	56002	±1	56003	56027	56025
650	F12				56003				
651	F12				56003				
652	F13	126	15	40	56001	±1	56001	56025	56022
653	F13				56000				
654	F13				56001				
655	F14	126	15	41	55997	±2	55998	56022	56019
656	F14				55999				
657	F14				55999				
658	F15	126	15	44	56001	±7	55999	56023	56020
659	F15				55997				
660	F15				56000				

TABLE 2

MAGNETIC DATA FROM THE FIELD NORTH OF THE ELECTROSCIENCE LABORATORY

TRIAL #	STATION	DAY	HOUR	MINUTE	READING (gammas)	STATION RANGE (gammas)	MEAN OF STATION READING (gammas)	MEAN OF READING ADJUSTED FOR DRIFT BETWEEN TRAVERSES (gammas)	MEAN OF READING CORRECTED FOR DRIFT WITHIN A TRAVERSE (gammas)
661	F16	126	15	46	56000	±2	56001	56025	56022
662	F16				56000				
663	F16				56002				
664	F17	126	15	47	56001	±5	56004	56028	56024
665	F17				56006				
666	F17				56004				
667	F18	126	15	50	55998	±8	56003	56027	56023
668	F18				56002				
669	F18				56000				
670	F19	126	15	53	55998	±1	55998	56022	56018
671	F19				55998				
672	F19				55997				
673	F20	126	15	55	55993	±0	55993	56017	56012
674	F20				55993				
675	F20				55993				
676	F21	126	15	56	55991	±1	55991	56015	56010
677	F21				55991				
678	F21				55990				
679	F22	126	15	58	55985	±1	55985	56009	56004
680	F22				55985				
681	F22				55986				
682	F23	126	16	0	55993	±1	55993	56017	56012
683	F23				55994				
684	F23				55993				

TABLE 2

MAGNETIC DATA FROM THE FIELD NORTH OF THE ELECTROSCIENCE LABORATORY

TRIAL #	STATION	DAY	HOUR	MINUTE	READING (gammas)	STATION RANGE (gammas)	MEAN OF STATION READING (gammas)	MEAN OF READING ADJUSTED FOR DRIFT BETWEEN TRAVERSES (gammas)	MEAN OF READING CORRECTED FOR DRIFT WITHIN A TRAVERSE (gammas)
685	F24	126	16	2	55982	±1	55982	56006	56001
686	F24				55983				
687	F24				55982				
688	F25	126	16	5	55993	±0	55993	56017	56011
689	F25				55993				
690	F25				55993				
691	F26	126	16	6	55985	±2	55984	56008	56002
692	F26				55983				
693	F26				55985				
694	F27	126	16	7	55984	±1	55984	56008	56002
695	F27				55984				
696	F27				55983				
697	F28	126	16	10	55988	±1	55988	56012	56006
698	F28				55988				
699	F28				55987				
700	F29	126	16	12	55999	±2	55999	56023	56116
701	F29				56000				
702	F29				55998				
703	F30	126	16	14	56005	±1	56005	56029	56022
704	F30				56005				
705	F30				56004				
706	F31	126	16	16	56009	±0	56009	56033	56026
707	F31				56009				
708	F31				56009				

TABLE 2

MAGNETIC DATA FROM THE FIELD NORTH OF THE ELECTROSCIENCE LABORATORY

TRIAL #	STATION	DAY	HOUR	MINUTE	READING (gammas)	STATION RANGE (gammas)	MEAN OF STATION READING (gammas)	MEAN OF READING ADJUSTED FOR DRIFT BETWEEN TRAVERSES (gammas)	MEAN OF READING CORRECTED FOR DRIFT WITHIN A TRAVERSE (gammas)
709	F32	126	16	18	55998	±2	55997	56021	56014
710	F32				55996				
711	F32				55997				
712	F33	126	16	20	55987	±8	55992	56016	56008
713	F33				55995				
714	F33				55995				
715	F34	126	16	22	55980	±3	55982	56006	55998
716	F34				55983				
717	F34				55983				
718	F35	126	16	23	55968	±2	55968	55992	55984
719	F35				55969				
720	F35				55967				
721	F36	126	16	25	55964	±2	55963	55987	55979
722	F36				55962				
723	F36				55962				
724	F37	126	16	37	55941	±2	55941	55965	55956
725	F37				55942				
726	F37				55940				
727	F38	126	16	29	55930	±2	55931	55955	55946
728	F38				55932				
729	F38				55931				
730	F39	126	16	31	55925	±0	55925	55949	55940
731	F39				55925				
732	F39				55925				

TABLE 2

MAGNETIC DATA FROM THE FIELD NORTH OF THE ELECTROSCIENCE LABORATORY

TRIAL #	STATION	DAY	HOUR	MINUTE	READING (gammas)	STATION RANGE (gammas)	MEAN OF STATION READING (gammas)	MEAN OF READING ADJUSTED FOR DRIFT BETWEEN TRAVERSES (gammas)	MEAN OF READING CORRECTED FOR DRIFT WITHIN A TRAVERSE (gammas)
733	F40	126	16	32	55917	±1	55916	55940	55931
734	F40				55916				
735	F40				55916				
736	F41	126	16	34	55915	±5	55917	55941	55932
737	F41				55920				
738	F41				55917				
	(Base)	126	16	36	56095	±0	56095	56119	56109
	(Base)				56095				
	(Base)				56095				
	(Base)	126	17	27	56115	±2	56116	56109	
	(Base)				56116				
	(Base)				56117				
739	G1	126	17	33	56050	±2	56051	56044	
740	G1				56052				
741	G1				56052				
742	G2	126	17	37	56063	±5	56065	56058	
743	G2				56064				
744	G2				56068				
745	G3	126	17	40	56090	±4	56089	56082	
746	G3				56090				
747	G3				56086				
748	G4	126	17	42	56126	±11	56132	56125	
749	G4				56134				
750	G4				56137				

TABLE 2

MAGNETIC DATA FROM THE FIELD NORTH OF THE ELECTROSCIENCE LABORATORY

TRIAL #	STATION	DAY	HOUR	MINUTE	READING (gammas)	STATION RANGE (gammas)	MEAN OF STATION READING (gammas)	MEAN OF READING ADJUSTED FOR DRIFT BETWEEN TRAVERSES (gammas)	MEAN OF READING CORRECTED FOR DRIFT WITHIN A TRAVERSE (gammas)
751	G5	126	17	44	56174	±11	56179	56172	
752	G5				56177				
753	G5				56185				
754	G6	126	17	47	56218	±4	56215	56208	
755	G6				56212				
756	G6				56214				
757	G7	126	17	50	56191	±7	56195	56188	
758	G7				56196				
759	G7				56198				
760	G8	126	17	54	56144	±8	56147	56140	
761	G8				56152				
762	G8				56145				
763	G9	126	17	56	56102	±2	56101	56094	
764	G9				56101				
765	G9				56100				
766	G10	126	17	59	56069	±3	56071	56064	
767	G10				56072				
768	G10				56071				
769	G11	126	18	1	56057	±5	56060	56063	
770	G11				56061				
771	G11				56062				
772	G12	126	18	4	56061	±5	56058	56051	
773	G12				56058				
774	G12				56056				

TABLE 2

MAGNETIC DATA FROM THE FIELD NORTH OF THE ELECTROSCIENCE LABORATORY

TRIAL #	STATION	DAY	HOUR	MINUTE	READING (gammas)	STATION RANGE (gammas)	MEAN OF STATION READING (gammas)	MEAN OF READING ADJUSTED FOR DRIFT BETWEEN TRAVERSES (gammas)	MEAN OF READING CORRECTED FOR DRIFT WITHIN A TRAVERSE (gammas)
775	G13	126	18	6	56073	±0	56073	56066	
774	G13				56073				
775	G13				56073				
778	G14	126	18	9	56094	±3	56094	56087	
779	G14				56095				
780	G14				56092				
781	G15	126	18	13	56124	±6	56121	56114	
782	G15				56118				
783	G15				56120				
784	G16	126	18	15	56134	±5	56137	56130	
785	G16				56139				
786	G16				56138				
787	G17	126	18	16	56130	±2	56131	56124	
788	G17				56130				
789	G17				56132				
790	G18	126	18	18	56105	±1	56104	56097	
791	G18				56104				
792	G18				56104				
793	G19	126	18	19	56075	±5	56072	56065	
794	G19				56072				
795	G19				56070				
796	G20	126	18	22	56049	±3	56047	56040	
797	G20				56047				
798	G20				56046				

TABLE 2

MAGNETIC DATA FROM THE FIELD NORTH OF THE ELECTROSCIENCE LABORATORY

TRIAL #	STATION	DAY	HOUR	MINUTE	READING (gammas)	STATION RANGE (gammas)	MEAN OF STATION READING (gammas)	MEAN OF READING ADJUSTED FOR DRIFT BETWEEN TRAVERSES (gammas)	MEAN OF READING CORRECTED FOR DRIFT WITHIN A TRAVERSE (gammas)
799	G21	126	18	24	56035	±2	56035	56028	
800	G21				56034				
801	G21				56036				
802	G22	126	18	27	56024	±2	56024	56017	
803	G22				56025				
804	G22				56023				
805	G23	126	18	30	56017	±1	56017	56010	
806	G23				56018				
807	G23				56017				
808	G24	126	18	32	56018	±1	56017	56010	
809	G24				56016				
810	G24				56016				
811	G25	126	18	34	56017	±3	56015	56008	
812	G25				56014				
813	G25				56014				
814	G26	126	18	35	56017	±0	56017	56010	
815	G26				56017				
816	G26				56017				
817	G27	126	18	37	56023	±2	56022	56015	
818	G27				56023				
819	G27				56021				
820	G28	126	18	39	56032	±1	56032	56025	
821	G28				56031				
822	G28				56032				

TABLE 2

MAGNETIC DATA FROM THE FIELD NORTH OF THE ELECTROSCIENCE LABORATORY

TRIAL #	STATION	DAY	HOUR	MINUTE	READING (gammas)	STATION RANGE (gammas)	MEAN OF STATION READING (gammas)	MEAN OF READING ADJUSTED FOR DRIFT BETWEEN TRAVERSES (gammas)	MEAN OF READING CORRECTED FOR DRIFT WITHIN A TRAVERSE (gammas)
823	G29	126	18	40	56037	±3	56036	56029	
824	G29				56037				
825	G29				56034				
826	G30	126	18	42	56050	±6	56046	56039	
827	G30				56044				
828	G30				56044				
829	G31	126	18	45	56056	±1	56056	56049	
830	G31				56056				
831	G31				56057				
832	G32	126	18	47	56050	±1	56051	56044	
833	G32				56051				
834	G32				56051				
835	G33	126	18	50	56038	±2	56039	56032	
836	G33				56040				
837	G33				56040				
838	G34	126	18	51	56020	±5	56017	56010	
839	G34				56016				
840	G34				56015				
841	G35	126	18	53	56002	±2	56003	55996	
842	G35				56002				
843	G35				56004				
844	G36	126	18	55	55989	±2	55988	55981	
845	G36				55987				
846	G36				55988				

TABLE 2

MAGNETIC DATA FROM THE FIELD NORTH OF THE ELECTROSCIENCE LABORATORY

TRIAL #	STATION	DAY	HOUR	MINUTE	READING (gammas)	STATION RANGE (gammas)	MEAN OF STATION READING (gammas)	MEAN OF READING ADJUSTED FOR DRIFT BETWEEN TRAVERSES (gammas)	MEAN OF READING CORRECTED FOR DRIFT WITHIN A TRAVERSE (gammas)
847	G37	126	18	57	55981	±5	55979	55972	
848	G37				55979				
849	G37				55976				
850	G38	126	18	59	55972	±4	55970	55963	
851	G38				55970				
852	G38				55968				
853	G39	126	19	1	55963	±2	55962	55955	
854	G39				55963				
855	G39				55961				
856	G40	126	19	2	55957	±4	55955	55948	
857	G40				55954				
858	G40				55953				
859	G41	126	19	5	55944	±3	55945	55938	
860	G41				55944				
861	G41				55947				
	(Base)	126	19	8	56115	±3	56114	56107	
	(Base)				56115				
	(Base)				56112				
	(Base)	127	10	40	56065	±1	56065	56109	
	(Base)				56065				
	(Base)				56064				
862	H1	127	10	45	55987	±1	55987	56031	
863	H1				55986				
864	H1				55987				

TABLE 2

MAGNETIC DATA FROM THE FIELD NORTH OF THE ELECTROSCIENCE LABORATORY

TRIAL #	STATION	DAY	HOUR	MINUTE	READING (gammas)	STATION RANGE (gammas)	MEAN OF STATION READING (gammas)	MEAN OF READING ADJUSTED FOR DRIFT BETWEEN TRAVERSES (gammas)	MEAN OF READING CORRECTED FOR DRIFT WITHIN A TRAVERSE (gammas)
865	H2	127	10	47	55986	±1	55986	56030	
866	H2				55986				
867	H2				55987				
868	H3	127	10	51	55985	±6	55988	56032	
869	H3				55988				
870	H3				55991				
871	H4	127	10	53	55991	±2	55990	56034	
872	H4				55990				
873	H4				55989				
874	H5	127	11	25	-	-	-	-	
875	H5				-				
876	H5				-				
877	H6	127	11	30	-	-	-	-	
878	H6				-				
879	H6				-				
880	H7	127	11	33	-	-	-	-	
881	H7				-				
882	H7				-				
883	H8	127	11	36	55975	±10	55981	56025	
884	H8				55985				
885	H8				55982				
886	H9	127	11	40	55963	±1	55963	56007	
887	H9				55962				
888	H9				55963				

TABLE 2

MAGNETIC DATA FROM THE FIELD NORTH OF THE ELECTROSCIENCE LABORATORY

TRIAL #	STATION	DAY	HOUR	MINUTE	READING (gammas)	STATION RANGE (gammas)	MEAN OF STATION READING (gammas)	MEAN OF READING ADJUSTED FOR DRIFT BETWEEN TRAVERSES (gammas)	MEAN OF READING CORRECTED FOR DRIFT WITHIN A TRAVERSE (gammas)
889	H10	127	11	42	55960	±6	55957	56001	
890	H10				55958				
891	H10				55954				
892	H11	127	11	43	55955	±3	55956	56000	
893	H11				55956				
894	H11				55958				
895	H12	127	11	45	55953	±2	55954	55998	
896	H12				55955				
897	H12				55955				
898	H13	127	11	47	55947	±2	55948	55992	
899	H13				55949				
900	H13				55948				
901	H14	127	11	50	55944	±2	55945	55989	
902	H14				55946				
903	H14				55945				
904	H15	127	11	51	55938	±3	55940	55984	
905	H15				55941				
906	H15				55940				
907	H16	127	11	52	55942	±6	55946	55990	
908	H16				55946				
909	H16				55940				
910	H17	127	11	55	55941	±3	55942	55986	
911	H17				55944				
912	H17				55942				

TABLE 2

MAGNETIC DATA FROM THE FIELD NORTH OF THE ELECTROSCIENCE LABORATORY

TRIAL #	STATION	DAY	HOUR	MINUTE	READING (gammas)	STATION RANGE (gammas)	MEAN OF STATION READING (gammas)	MEAN OF READING ADJUSTED FOR DRIFT BETWEEN TRAVERSES (gammas)	MEAN OF READING CORRECTED FOR DRIFT WITHIN A TRAVERSE (gammas)
913	H18	127	11	56	55953	±3	55952	55996	
914	H18				55952				
915	H18				55950				
916	H19	127	11	58	55950	±5	55952	55996	
917	H19				55951				
918	H19				55955				
919	H20	127	12	0	55957	±2	55956	56000	
920	H20				55955				
921	H20				55957				
922	H21	127	12	2	55955	±1	55956	56000	
923	H21				55956				
924	H21				55956				
925	H22	127	12	4	55957	±1	55957	56001	
926	H22				55956				
927	H22				55957				
928	H23	127	12	5	55957	±1	55957	56001	
929	H23				55957				
930	H23				55956				
931	H24	127	12	7	55956	±1	55956	56000	
932	H24				55955				
933	H24				55956				
934	H25	127	12	9	55955	±1	55955	55999	
935	H25				55956				
936	H25				55955				

TABLE 2

MAGNETIC DATA FROM THE FIELD NORTH OF THE ELECTROSCIENCE LABORATORY

TRIAL #	STATION	DAY	HOUR	MINUTE	READING (gammas)	STATION RANGE (gammas)	MEAN OF STATION READING (gammas)	MEAN OF READING ADJUSTED FOR DRIFT BETWEEN TRAVERSES (gammas)	MEAN OF READING CORRECTED FOR DRIFT WITHIN A TRAVERSE (gammas)
937	H26	127	12	11	55954	±1	55954	55998	
938	H26				55953				
939	H26				55954				
940	H27	127	12	13	55954	±0	55954	55998	
941	H27				55954				
942	H27				55954				
943	H28	127	12	15	55955	±2	55954	55998	
944	H28				55955				
945	H28				55953				
946	H29	127	12	16	55956	±3	55955	55999	
947	H29				55955				
948	H29				55953				
949	H30	127	12	18	55954	±3	55956	56000	
950	H30				55956				
951	H30				55957				
952	H31	127	12	20	55953	±1	55954	55958	
953	H31				55954				
954	H31				55954				
955	H32	127	12	22	55951	±4	55951	55995	
956	H32				55949				
957	H32				55953				
958	H33	127	12	24	55947	±2	55948	55992	
959	H33				55947				
960	H33				55949				

TABLE 2

MAGNETIC DATA FROM THE FIELD NORTH OF THE ELECTROSCIENCE LABORATORY

TRIAL #	STATION	DAY	HOUR	MINUTE	READING (gammas)	STATION RANGE (gammas)	MEAN OF STATION READING (gammas)	MEAN OF READING ADJUSTED FOR DRIFT BETWEEN TRAVERSES (gammas)	MEAN OF READING CORRECTED FOR DRIFT WITHIN A TRAVERSE (gammas)
961	H34	127	12	25	55939	±3	55939	55983	
962	H34				55938				
963	H34				55941				
964	H35	127	12	27	55935	±2	55935	55979	
965	H35				55936				
966	H35				55934				
967	H36	127	12	29	55930	±1	55930	55974	
968	H36				55931				
969	H36				55930				
970	H37	127	12	30	55926	±1	55927	55971	
971	H37				55927				
972	H37				55927				
973	H38	127	12	31	55923	±2	55923	55967	
974	H38				55922				
975	H38				55924				
976	H39	127	12	33	55918	±1	55917	55961	
977	H39				55917				
978	H39				55917				
979	H40	127	12	35	55912	±1	55912	55956	
980	H40				55912				
981	H40				55913				
982	H41	127	12	37	55906	±1	55906	55950	
983	H41				55907				
984	H41				55906				

TABLE 2

MAGNETIC DATA FROM THE FIELD NORTH OF THE ELECTROSCIENCE LABORATORY

TRIAL #	STATION	DAY	HOUR	MINUTE	READING (gammas)	STATION RANGE (gammas)	MEAN OF STATION READING (gammas)	MEAN OF READING ADJUSTED FOR DRIFT BETWEEN TRAVERSES (gammas)	MEAN OF READING CORRECTED FOR DRIFT WITHIN A TRAVERSE (gammas)
	(Base)	127	12	40	56068	±0	56068	56112	
	(Base)				56068				
	(Base)				56068				
	(Base)	132	10	48	56054	±2	56053	56109	56109
	(Base)				56052				
	(Base)				56053				
985	I1	132	10	53	55965	±0	55965	56021	56021
986	I1				55965				
987	I1				55965				
988	I2	132	10	55	55948	±2	55949	56005	56005
989	I2				55950				
990	I2				55950				
991	I3	132	11	57	55922	±2	55923	55979	55978
992	I3				55924				
993	I3				55923				
994	I4	132	11	0	55864	±10	55871	55927	55926
995	I4				55874				
906	I4				55874				
997	I5	132	11	3	55792	±1	55792	55848	55847
998	I5				55792				
999	I5				55793				
1000	I6	132	11	6	55728	±1	55729	55785	55783
1001	I6				55729				
1002	I6				55729				

TABLE 2

MAGNETIC DATA FROM THE FIELD NORTH OF THE ELECTROSCIENCE LABORATORY

TRIAL #	STATION	DAY	HOUR	MINUTE	READING (gammas)	STATION RANGE (gammas)	MEAN OF STATION READING (gammas)	MEAN OF READING ADJUSTED FOR DRIFT BETWEEN TRAVERSES (gammas)	MEAN OF READING CORRECTED FOR DRIFT WITHIN A TRAVERSE (gammas)
1003	I7	132	11	8	55743	±12	55738	55794	55792
1004	I7				55739				
1005	I7				55731				
1006	I8	132	11	10	55811	±4	55808	55864	55862
1007	I8				55805				
1008	I8				55807				
1009	I9	132	11	12	55870	±4	55872	55928	55926
1010	I9				55874				
1011	I9				55871				
1012	I10	132	11	14	55909	±3	55911	55967	55965
1013	I10				55911				
1014	I10				55912				
1015	I11	132	11	16	55924	±1	55925	55981	55978
1016	I11				55925				
1017	I11				55925				
1018	I12	132	11	17	55920	±2	55921	55977	55974
1019	I12				55922				
1020	I12				55920				
1021	I13	132	11	20	55902	±3	55902	55958	55955
1022	I13				55900				
1023	I13				55903				
1024	I14	132	11	22	55871	±2	55872	55928	55925
1025	I14				55872				
1026	I14				55874				

TABLE 2

MAGNETIC DATA FROM THE FIELD NORTH OF THE ELECTROSCIENCE LABORATORY

TRIAL #	STATION	DAY	HOUR	MINUTE	READING (gammas)	STATION RANGE (gammas)	MEAN OF STATION READING (gammas)	MEAN OF READING ADJUSTED FOR DRIFT BETWEEN TRAVERSES (gammas)	MEAN OF READING CORRECTED FOR DRIFT WITHIN A TRAVERSE (gammas)
1027	I15	132	11	24	55843	±3	55842	55898	55894
1028	I15				55842				
1029	I15				55840				
1030	I16	132	11	27	55824	±4	55827	55883	55879
1031	I16				55828				
1032	I16				55828				
1033	I17	132	11	28	55836	±6	55840	55896	55892
1034	I17				55842				
1035	I17				55841				
1036	I18	132	11	30	55867	±2	55868	55924	55920
1037	I18				55867				
1038	I18				55869				
1039	I19	132	11	33	55901	±1	55901	55957	55952
1040	I19				55901				
1041	I19				55900				
1042	I20	132	11	35	55921	±0	55921	55977	55972
1043	I20				55921				
1044	I20				55921				
1045	I21	132	11	38	55937	±0	55937	55993	55988
1046	I21				55937				
1047	I21				55937				
1048	I22	132	11	40	55944	±2	55945	56001	55996
1049	I22				55945				
1050	I22				55946				

TABLE 2

MAGNETIC DATA FROM THE FIELD NORTH OF THE ELECTROSCIENCE LABORATORY

TRIAL #	STATION	DAY	HOUR	MINUTE	READING (gammas)	STATION RANGE (gammas)	MEAN OF STATION READING (gammas)	MEAN OF READING ADJUSTED FOR DRIFT BETWEEN TRAVERSES (gammas)	MEAN OF READING CORRECTED FOR DRIFT WITHIN A TRAVERSE (gammas)
1051	I23	132	11	44	55946	±1	55946	56002	55996
1052	I23				55946				
1053	I23				55947				
1054	I24	132	11	45	55946	±2	55947	56003	55997
1055	I24				55947				
1056	I24				55948				
1057	I25	132	11	48	55944	±3	55946	56002	55996
1058	I25				55947				
1059	I25				55946				
1060	I26	132	11	51	55942	±1	55942	55998	55991
1061	I26				55941				
1062	I26				55942				
1063	I27	132	11	53	55939	±1	55939	55995	55988
1064	I27				55940				
1065	I27				55939				
1066	I28	132	11	55	55932	±1	55932	55988	55981
1067	I28				55933				
1068	I28				55932				
1069	I29	132	11	56	55922	±2	55923	55979	55972
1070	I29				55924				
1071	I29				55923				
1072	I30	132	11	58	55913	±4	55914	55970	55963
1073	I30				55912				
1074	I30				55916				

TABLE 2

MAGNETIC DATA FROM THE FIELD NORTH OF THE ELECTROSCIENCE LABORATORY

TRIAL #	STATION	DAY	HOUR	MINUTE	READING (gammas)	STATION RANGE (gammas)	MEAN OF STATION READING (gammas)	MEAN OF READING ADJUSTED FOR DRIFT BETWEEN TRAVERSES (gammas)	MEAN OF READING CORRECTED FOR DRIFT WITHIN A TRAVERSE (gammas)
1075	I31	132	12	2	55910	±4	55909	55965	55957
1076	I31				55907				
1077	I31				55911				
1078	I32	132	12	4	55911	±3	55910	55966	55958
1079	I32				55908				
1080	I32				55910				
1081	I33	132	12	5	55911	±0	55911	55967	55959
1082	I33				55911				
1083	I33				55911				
1084	I34	132	12	7	55915	±1	55915	55971	55963
1085	I34				55916				
1086	I34				55916				
1087	I35	132	12	10	55922	±1	55922	55978	55969
1088	I35				55922				
1089	I35				55921				
1090	I36	132	12	27	55918	±4	55920	55976	55965
1091	I36				55921				
1092	I36				55922				
1093	I37	132	12	29	55923	±1	55924	55980	55969
1094	I37				55924				
1095	I37				55924				
1096	I38	132	12	30	55921	±1	55922	55978	55967
1097	I38				55922				
1098	I38				55922				

TABLE 2

MAGNETIC DATA FROM THE FIELD NORTH OF THE ELECTROSCIENCE LABORATORY

TRIAL #	STATION	DAY	HOUR	MINUTE	READING (gammas)	STATION RANGE (gammas)	MEAN OF STATION READING (gammas)	MEAN OF READING ADJUSTED FOR DRIFT BETWEEN TRAVERSES (gammas)	MEAN OF READING CORRECTED FOR DRIFT WITHIN A TRAVERSE (gammas)
1099	I39	132	12	31	55919	±0	55919	55975	55964
1100	I39				55919				
1101	I39				55919				
1102	I40	132	12	33	55915	±1	55915	55971	55960
1103	I40				55915				
1104	I40				55914				
1105	I41	132	12	35	55908	±1	55908	55964	55953
1106	I41				55908				
1107	I41				55909				
	(Base)	132	12	37	56066	±1	56065	56121	56109
	(Base)				56065				
	(Base)				56065				
	(Base)	127	17	40	56099	±1	56099	56109	
	(Base)				56100				
	(Base)				56099				
1108	J1	127	17	43	56033	±1	56033	56043	
1109	J1				56033				
1110	J1				56032				
1111	J2	127	17	45	56020	±1	56021	56031	
1112	J2				56021				
1113	J2				56021				
1114	J3	127	17	47	56006	±2	56005	56015	
1115	J3				56004				
1116	J3				56005				

TABLE 2

MAGNETIC DATA FROM THE FIELD NORTH OF THE ELECTROSCIENCE LABORATORY

TRIAL #	STATION	DAY	HOUR	MINUTE	READING (gammas)	STATION RANGE (gammas)	MEAN OF STATION READING (gammas)	MEAN OF READING ADJUSTED FOR DRIFT BETWEEN TRAVERSES (gammas)	MEAN OF READING CORRECTED FOR DRIFT WITHIN A TRAVERSE (gammas)
1117	J4	127	17	48	55987	±5	55984	55994	
1118	J4				55984				
1119	J4				55982				
1120	J5	127	17	50	55969	±8	55967	55977	
1121	J5				55962				
1122	J5				55970				
1123	J6	127	17	52	55946	±1	55945	55955	
1124	J6				55945				
1125	J6				55945				
1126	J7	127	17	56	55948	±1	55948	55958	
1127	J7				55948				
1128	J7				55949				
1129	J8	127	17	58	55949	±1	55959	55969	
1130	J8				55959				
1131	J8				55960				
1132	J9	127	18	2	55975	±3	55975	55985	
1133	J9				55974				
1134	J9				55977				
1135	J10	127	18	3	55986	±1	55986	55996	
1136	J10				55987				
1137	J10				55986				

TABLE 2

MAGNETIC DATA FROM THE FIELD NORTH OF THE ELECTROSCIENCE LABORATORY

TRIAL #	STATION	DAY	HOUR	MINUTE	READING (gammas)	STATION RANGE (gammas)	MEAN OF STATION READING (gammas)	MEAN OF READING ADJUSTED FOR DRIFT BETWEEN TRAVERSES (gammas)	MEAN OF READING CORRECTED FOR DRIFT WITHIN A TRAVERSE (gammas)
1138	J11	127	18	5	55989	±2	55990	56000	
1139	J11				55991				
1140	J11				55990				
1141	J12	127	18	7	55991	±2	55990	56000	
1142	J12				55989				
1143	J12				55990				
1144	J13	127	18	8	55983	±2	55982	55992	
1145	J13				55983				
1146	J13				55981				
1147	J14	127	18	10	55969	±7	55972	55982	
1148	J14				55972				
1149	J14				55976				
1150	J15	127	18	12	55959	±2	55960	55970	
1151	J15				55959				
1152	J15				55961				
1153	J16	127	18	14	55953	±3	55954	55964	
1154	J16				55956				
1155	J16				55953				
1156	J17	127	18	16	55957	±5	55959	55969	
1157	J17				55962				
1158	J17				55958				
1159	J18	127	18	18	55968	±3	55968	55978	
1160	J18				55966				
1161	J18				55969				

TABLE 2

MAGNETIC DATA FROM THE FIELD NORTH OF THE ELECTROSCIENCE LABORATORY

TRIAL #	STATION	DAY	HOUR	MINUTE	READING (gammas)	STATION RANGE (gammas)	MEAN OF STATION READING (gammas)	MEAN OF READING ADJUSTED FOR DRIFT BETWEEN TRAVERSES (gammas)	MEAN OF READING CORRECTED FOR DRIFT WITHIN A TRAVERSE (gammas)
1162	J19	127	18	20	55968	±0	55978	55988	
1163	J19				55978				
1164	J19				55978				
1165	J20	127	18	22	55990	±2	55990	56000	
1166	J20				55989				
1167	J20				55991				
1168	J21	127	18	25	55997	±1	55998	56008	
1169	J21				55998				
1170	J21				55998				
1171	J22	127	18	27	56000	±1	56001	56011	
1172	J22				56001				
1173	J22				56001				
1174	J23	127	18	28	56002	±1	56002	56012	
1175	J23				56002				
1176	J23				56001				
1177	J24	127	18	30	56000	±0	56000	56010	
1178	J24				56000				
1179	J24				56000				
1180	J25	127	18	31	55997	±1	55997	56007	
1181	J25				55997				
1182	J25				55998				
1183	J26	127	18	33	55993	±1	55993	56003	
1184	J26				55993				
1185	J26				55994				

TABLE 2

MAGNETIC DATA FROM THE FIELD NORTH OF THE ELECTROSCIENCE LABORATORY

TRIAL #	STATION	DAY	HOUR	MINUTE	READING (gammas)	STATION RANGE (gammas)	MEAN OF STATION READING (gammas)	MEAN OF READING ADJUSTED FOR DRIFT BETWEEN TRAVERSES (gammas)	MEAN OF READING CORRECTED FOR DRIFT WITHIN A TRAVERSE (gammas)
1186	J27	127	18	34	55988	±1	55987	55997	
1187	J27				55987				
1188	J27				55987				
1189	J28	127	18	36	55980	±0	55980	55990	
1190	J28				55980				
1191	J28				55980				
1192	J29	127	18	37	55970	±1	55971	55981	
1193	J29				55971				
1194	J29				55971				
1195	J30	127	18	40	55962	±1	55962	55972	
1196	J30				55962				
1197	J30				55963				
1198	J31	127	18	42	55957	±1	55957	55967	
1199	J31				55957				
1200	J31				55956				
1201	J32	127	18	44	55954	±3	55954	55964	
1202	J32				55952				
1203	J32				55955				
1204	J33	127	18	45	55955	±1	55955	55965	
1205	J33				55954				
1206	J33				55955				
1207	J34	127	18	46	55957	±2	55958	55968	
1208	J34				55959				
1209	J34				55959				

TABLE 2

MAGNETIC DATA FROM THE FIELD NORTH OF THE ELECTROSCIENCE LABORATORY

TRIAL #	STATION	DAY	HOUR	MINUTE	READING (gammas)	STATION RANGE (gammas)	MEAN OF STATION READING (gammas)	MEAN OF READING ADJUSTED FOR DRIFT BETWEEN TRAVERSES (gammas)	MEAN OF READING CORRECTED FOR DRIFT WITHIN A TRAVERSE (gammas)
1210	J35	127	18	50	55962	±2	55963	55973	
1211	J35				55963				
1212	J35				55964				
1213	J36	127	18	51	55966	±1	55965	55975	
1214	J36				55965				
1215	J36				55965				
1216	J37	127	18	54	55967	±2	55967	55977	
1217	J37				55968				
1218	J37				55966				
1219	J38	127	18	55	55966	±1	55966	55976	
1220	J38				55967				
1221	J38				55966				
1222	J39	127	18	56	55964	±1	55964	55974	
1223	J39				55964				
1224	J39				55965				
1225	J40	127	18	58	55962	±0	55962	55972	
1226	J40				55962				
1227	J40				55962				
1228	J41	127	19	0	55959	±1	55958	55968	
1229	J41				55958				
1230	J41				55958				
	(Base)	127	19	2	56101	±1	56101	56111	
	(Base)				56101				
	(Base)				56102				

TABLE 2

MAGNETIC DATA FROM THE FIELD NORTH OF THE ELECTROSCIENCE LABORATORY

TRIAL #	STATION	DAY	HOUR	MINUTE	READING (gammas)	STATION RANGE (gammas)	MEAN OF STATION READING (gammas)	MEAN OF READING ADJUSTED FOR DRIFT BETWEEN TRAVERSES (gammas)	MEAN OF READING CORRECTED FOR DRIFT WITHIN A TRAVERSE (gammas)
	(Base)	128	10	35	56074	±0	56074	56109	56109
	(Base)				56074				
	(Base)				56074				
1231	K1	128	10	39	56092	±3	56094	56129	56129
1232	K1				56095				
1233	K1				56094				
1234	K2	128	10	41	56130	±9	56136	56171	56171
1235	K2				56138				
1236	K2				56139				
1237	K3	128	10	47	56166	±4	56167	56202	56202
1238	K3				56165				
1239	K3				56169				
1240	K4	128	10	51	56146	±10	56141	56176	56176
1241	K4				56142				
1242	K4				56136				
1243	K5	128	10	55	56096	±8	56095	56130	56130
1244	K5				56091				
1245	K5				56099				
1246	K6	128	11	0	56065	±4	56062	56097	56096
1247	K6				56061				
1248	K6				56061				
1249	K7	128	11	2	56044	±3	56042	56077	56076
1250	K7				56042				
1251	K7				56041				

TABLE 2

MAGNETIC DATA FROM THE FIELD NORTH OF THE ELECTROSCIENCE LABORATORY

TRIAL #	STATION	DAY	HOUR	MINUTE	READING (gammas)	STATION RANGE (gammas)	MEAN OF STATION READING (gammas)	MEAN OF READING ADJUSTED FOR DRIFT BETWEEN TRAVERSES (gammas)	MEAN OF READING CORRECTED FOR DRIFT WITHIN A TRAVERSE (gammas)
1252	K8	128	11	4	56036	±3	56034	56069	56068
1253	K8				56032				
1254	K8				56033				
1255	K9	128	11	6	56032	±2	56031	56066	56065
1256	K9				56030				
1257	K9				56030				
1258	K10	128	11	8	56027	±2	56026	56061	56060
1259	K10				56027				
1260	K10				56025				
1261	K11	128	11	20	56024	±1	56024	56059	56058
1262	K11				56024				
1263	K11				56023				
1264	K12	128	11	21	56022	±1	56022	56057	56055
1265	K12				56021				
1266	K12				56022				
1267	K13	128	11	25	56023	±5	56020	56055	56053
1268	K13				56018				
1269	K13				56019				
1270	K14	128	11	26	56025	±2	56024	56059	56057
1271	K14				56024				
1272	K14				56023				
1273	K15	128	11	28	56030	±4	56029	56064	56062
1274	K15				56031				
1275	K15				56027				

TABLE 2

MAGNETIC DATA FROM THE FIELD NORTH OF THE ELECTROSCIENCE LABORATORY

TRIAL #	STATION	DAY	HOUR	MINUTE	READING (gammas)	STATION RANGE (gammas)	MEAN OF STATION READING (gammas)	MEAN OF READING ADJUSTED FOR DRIFT BETWEEN TRAVERSES (gammas)	MEAN OF READING CORRECTED FOR DRIFT WITHIN A TRAVERSE (gammas)
1276	K16	128	11	30	56038	±3	56038	56073	56071
1277	K16				56036				
1278	K16				56039				
1279	K17	128	11	32	56049	±5	56052	56087	56085
1280	K17				56054				
1281	K17				56053				
1282	K18	128	11	34	56050	±3	56051	56086	56084
1283	K18				56053				
1284	K18				56051				
1285	K19	128	11	36	56044	±4	56042	56077	56075
1286	K19				56040				
1287	K19				56041				
1288	K20	128	11	38	56021	±7	56026	56061	56059
1289	K20				56028				
1290	K20				56028				
1291	K21	128	11	40	56008	±2	56007	56042	56040
1292	K21				56006				
1293	K21				56008				
1294	K22	128	11	42	55995	±1	55996	56031	56029
1295	K22				55996				
1296	K22				55996				
1297	K23	128	11	44	55989	±3	55990	56025	56022
1298	K23				55992				
1299	K23				55990				

TABLE 2

MAGNETIC DATA FROM THE FIELD NORTH OF THE ELECTROSCIENCE LABORATORY

TRIAL #	STATION	DAY	HOUR	MINUTE	READING (gammas)	STATION RANGE (gammas)	MEAN OF STATION READING (gammas)	MEAN OF READING ADJUSTED FOR DRIFT BETWEEN TRAVERSES (gammas)	MEAN OF READING CORRECTED FOR DRIFT WITHIN A TRAVERSE (gammas)
1300	K24	128	11	46	55988	±11	55992	56027	56024
1301	K24				55989				
1302	K24				55999				
1303	K25	128	11	48	55986	±2	55987	56022	56019
1304	K25				55987				
1305	K25				55988				
1306	K26	128	11	50	55985	±1	55986	56021	56018
1307	K26				55986				
1308	K26				55986				
1309	K27	128	11	51	55984	±1	55984	56019	56016
1310	K27				55985				
1311	K27				55984				
1312	K28	128	11	53	55985	±2	55986	56021	56018
1313	K28				55985				
1314	K28				55987				
1315	K29	128	11	55	55989	±3	55989	56024	56021
1316	K29				55990				
1317	K29				55987				
1318	K30	128	11	57	55992	±2	55993	56028	56025
1319	K30				55993				
1320	K30				55994				
1321	K31	128	11	59	56004	±2	56004	56039	56036
1322	K31				56003				
1323	K31				56005				

TABLE 2

MAGNETIC DATA FROM THE FIELD NORTH OF THE ELECTROSCIENCE LABORATORY

TRIAL #	STATION	DAY	HOUR	MINUTE	READING (gammas)	STATION RANGE (gammas)	MEAN OF STATION READING (gammas)	MEAN OF READING ADJUSTED FOR DRIFT BETWEEN TRAVERSES (gammas)	MEAN OF READING CORRECTED FOR DRIFT WITHIN A TRAVERSE (gammas)
1324	K32	128	12	2	56013	±1	56013	56048	56045
1325	K32				56013				
1326	K32				56014				
1327	K33	128	12	4	56016	±5	56019	56054	56051
1328	K33				56021				
1329	K33				56019				
1330	K34	128	12	5	56008	±5	56010	56045	56042
1331	K34				56010				
1332	K34				56013				
1333	K35	128	12	7	55993	±3	55992	56027	56023
1334	K35				55990				
1335	K35				55993				
1336	K36	128	12	10	55973	±1	55973	56008	56004
1337	K36				55972				
1338	K36				55973				
1339	K37	128	12	12	55956	±1	55956	55991	55987
1340	K37				55957				
1341	K37				55956				
1342	K38	128	12	13	55943	±2	55943	55978	55974
1343	K38				55942				
1344	K38				55944				
1345	K39	128	12	15	55933	±1	55933	55968	55964
1346	K39				55932				
1347	K39				55933				

TABLE 2

MAGNETIC DATA FROM THE FIELD NORTH OF THE ELECTROSCIENCE LABORATORY

TRIAL #	STATION	DAY	HOUR	MINUTE	READING (gammas)	STATION RANGE (gammas)	MEAN OF STATION READING (gammas)	MEAN OF READING ADJUSTED FOR DRIFT BETWEEN TRAVERSES (gammas)	MEAN OF READING CORRECTED FOR DRIFT WITHIN A TRAVERSE (gammas)
1348	K40	128	12	16	55923	±2	55924	55959	55955
1349	K40				55925				
1350	K40				55925				
1351	K41	128	12	19	55918	±1	55918	55953	55949
1352	K41				55918				
1353	K41				55919				
1354	K42	128	12	21	55910	±3	55911	55946	55942
1355	K42				55911				
1356	K42				55913				
1357	K43	128	12	24	55906	±2	55905	55940	55936
1358	K43				55904				
1359	K43				55906				
1360	K44	128	12	25	55897	±3	55899	55934	55930
1361	K44				55899				
1362	K44				55900				
1363	K45	128	12	28	55891	±1	55891	55926	55922
1364	K45				55890				
1365	K45				55891				
1366	K46	128	12	30	55880	±3	55882	55917	55912
1367	K46				55882				
1368	K46				55883				
	(Base)	128	12	31	56079	±0	56079	56114	56109
	(Base)				56079				
	(Base)				56079				

TABLE 2

MAGNETIC DATA FROM THE FIELD NORTH OF THE ELECTROSCIENCE LABORATORY

TRIAL #	STATION	DAY	HOUR	MINUTE	READING (gammas)	STATION RANGE (gammas)	MEAN OF STATION READING (gammas)	MEAN OF READING ADJUSTED FOR DRIFT BETWEEN TRAVERSES (gammas)	MEAN OF READING CORRECTED FOR DRIFT WITHIN A TRAVERSE (gammas)
	(Base)	128	13	37	56080	±2	56081	56109	
	(Base)				56082				
	(Base)				56082				
1369	L1	128	13	40	55977	±3	55977	56005	
1370	L1				55979				
1371	L1				55976				
1372	L2	128	13	41	55932	±5	55929	55957	
1373	L2				55929				
1374	L2				55927				
1375	L3	128	13	43	55897	±2	55896	55924	
1376	L3				55895				
1377	L3				55896				
1378	L4	128	13	45	55906	±4	55908	55936	
1379	L4				55910				
1380	L4				55908				
1381	L5	128	13	47	55942	±2	55943	55971	
1382	L5				55943				
1383	L5				55944				
1384	L6	128	13	48	55978	±6	55981	56009	
1385	L6				55981				
1386	L6				55984				
1387	L7	128	13	50	56006	±2	56007	56035	
1388	L7				56007				
1389	L7				56008				

TABLE 2

MAGNETIC DATA FROM THE FIELD NORTH OF THE ELECTROSCIENCE LABORATORY

TRIAL #	STATION	DAY	HOUR	MINUTE	READING (gammas)	STATION RANGE (gammas)	MEAN OF STATION READING (gammas)	MEAN OF READING ADJUSTED FOR DRIFT BETWEEN TRAVERSES (gammas)	MEAN OF READING CORRECTED FOR DRIFT WITHIN A TRAVERSE (gammas)
1390	L8	128	13	52	56019	±2	56018	56046	
1391	L8				56017				
1392	L8				56017				
1393	L9	128	13	54	56024	±2	56025	56053	
1394	L9				56026				
1395	L9				56024				
1396	L10	128	13	56	56027	±3	56029	56057	
1397	L10				56029				
1398	L10				56030				
1399	L11	128	13	58	56028	±1	56027	56055	
1400	L11				56027				
1401	L11				56027				
1402	L12	128	14	0	56025	±1	56025	56053	
1403	L12				56024				
1404	L12				56025				
1405	L13	128	14	2	56018	±2	56018	56046	
1406	L13				56019				
1407	L13				56017				
1408	L14	128	14	4	56006	±1	56005	56033	
1409	L14				56005				
1410	L14				56005				
1411	L15	128	14	6	55986	±1	55986	56014	
1412	L15				55985				
1413	L15				55986				

TABLE 2

MAGNETIC DATA FROM THE FIELD NORTH OF THE ELECTROSCIENCE LABORATORY

TRIAL #	STATION	DAY	HOUR	MINUTE	READING (gammas)	STATION RANGE (gammas)	MEAN OF STATION READING (gammas)	MEAN OF READING ADJUSTED FOR DRIFT BETWEEN TRAVERSES (gammas)	MEAN OF READING CORRECTED FOR DRIFT WITHIN A TRAVERSE (gammas)
1414	L16	128	14	7	55959	±3	55960	55988	
1415	L16				55962				
1416	L16				55960				
1417	L17	128	14	8	55930	±2	55931	55959	
1418	L17				55930				
1419	L17				55932				
1420	L18	128	14	10	55914	±1	55914	55942	
1421	L18				55914				
1422	L18				55915				
1423	L19	128	14	13	55915	±3	55917	55945	
1424	L19				55918				
1425	L19				55918				
1426	L20	128	14	15	55937	±0	55937	55965	
1427	L20				55937				
1428	L20				55937				
1429	L21	128	14	17	55960	±1	55960	55988	
1430	L21				55960				
1431	L21				55959				
1432	L22	128	14	19	55978	±1	55978	56006	
1433	L22				55978				
1434	L22				55977				
1435	L23	128	14	21	55988	±1	55989	56017	
1436	L23				55989				
1437	L23				55989				

TABLE 2

MAGNETIC DATA FROM THE FIELD NORTH OF THE ELECTROSCIENCE LABORATORY

TRIAL #	STATION	DAY	HOUR	MINUTE	READING (gammas)	STATION RANGE (gammas)	MEAN OF STATION READING (gammas)	MEAN OF READING ADJUSTED FOR DRIFT BETWEEN TRAVERSES (gammas)	MEAN OF READING CORRECTED FOR DRIFT WITHIN A TRAVERSE (gammas)
1438	L24	128	14	23	55994	±1	55994	56022	
1439	L24				55995				
1440	L24				55994				
1441	L25	128	14	25	55997	±1	55997	56025	
1442	L25				55998				
1443	L25				55997				
1444	L26	128	14	27	55995	±2	55995	56023	
1445	L26				55996				
1446	L26				55994				
1447	L27	128	14	30	55992	±1	55992	56020	
1448	L27				55992				
1449	L27				55993				
1450	L28	128	14	31	55984	±1	55984	56012	
1451	L28				55984				
1452	L28				55985				
1453	L29	128	14	33	55975	±12	55976	56004	
1454	L29				55983				
1455	L29				55971				
1456	L30	128	14	35	55958	±1	55957	55985	
1457	L30				55957				
1458	L30				55957				
1459	L31	128	14	37	55939	±4	55938	55966	
1460	L31				55939				
1461	L31				55935				

TABLE 2

MAGNETIC DATA FROM THE FIELD NORTH OF THE ELECTROSCIENCE LABORATORY

TRIAL #	STATION	DAY	HOUR	MINUTE	READING (gammas)	STATION RANGE (gammas)	MEAN OF STATION READING (gammas)	MEAN OF READING ADJUSTED FOR DRIFT BETWEEN TRAVERSES (gammas)	MEAN OF READING CORRECTED FOR DRIFT WITHIN A TRAVERSE (gammas)
1462	L32	128	14	38	55921	±2	55920	55948	
1463	L32				55919				
1464	L32				55919				
1465	L33	128	14	40	55904	±1	55904	55932	
1466	L33				55904				
1467	L33				55905				
1468	L34	128	14	41	55905	±1	55905	55933	
1469	L34				55905				
1470	L34				55906				
1471	L35	128	14	43	55910	±1	55910	55938	
1472	L35				55910				
1473	L35				55911				
1474	L36	128	14	45	55920	±2	55919	55947	
1475	L36				55919				
1476	L36				55918				
1477	L37	128	14	45	55928	±2	55927	55955	
1478	L37				55927				
1479	L37				55926				
1480	L38	128	14	50	55931	±1	55932	55960	
1481	L38				55932				
1482	L38				55932				
1483	L39	128	14	51	55935	±1	55934	55962	
1484	L39				55934				
1485	L39				55934				

TABLE 2

MAGNETIC DATA FROM THE FIELD NORTH OF THE ELECTROSCIENCE LABORATORY

TRIAL #	STATION	DAY	HOUR	MINUTE	READING (gammas)	STATION RANGE (gammas)	MEAN OF STATION READING (gammas)	MEAN OF READING ADJUSTED FOR DRIFT BETWEEN TRAVERSES (gammas)	MEAN OF READING CORRECTED FOR DRIFT WITHIN A TRAVERSE (gammas)
1486	L40	128	15	5	55933	±2	55932	55960	
1487	L40				55932				
1488	L40				55931				
1489	L41	128	15	6	55928	±0	55928	55956	
1490	L41				55928				
1491	L41				55928				
1492	L42	128	15	8	55923	±2	55922	55950	
1493	L42				55921				
1494	L42				55922				
1495	L43	128	15	10	55915	±1	55915	55943	
1496	L43				55916				
1497	L43				55915				
1498	L44	128	15	11	55909	±0	55909	55937	
1499	L44				55909				
1500	L44				55909				
1501	L45	128	15	13	55900	±2	55901	55929	
1502	L45				55902				
1503	L45				55902				
1504	L46	128	15	15	55893	±0	55893	55921	
1505	L46				55893				
1506	L46				55893				
	(Base)	128	15	17	56083	±2	56084	56112	
	(Base)				56084				
	(Base)				56085				

TABLE 2

MAGNETIC DATA FROM THE FIELD NORTH OF THE ELECTROSCIENCE LABORATORY

TRIAL #	STATION	DAY	HOUR	MINUTE	READING (gammas)	STATION RANGE (gammas)	MEAN OF STATION READING (gammas)	MEAN OF READING ADJUSTED FOR DRIFT BETWEEN TRAVERSES (gammas)	MEAN OF READING CORRECTED FOR DRIFT WITHIN A TRAVERSE (gammas)
	(Base)	128	19	4	56123	±1	56123	56109	56109
	(Base)				56123				
	(Base)				56122				
1507	M1	128	19	6	56050	±1	56050	56036	56036
1508	M1				56050				
1509	M1				56049				
1510	M2	128	19	8	56026	±7	56025	56011	56011
1511	M2				56028				
1512	M2				56021				
1513	M3	128	19	10	56002	±6	56006	55992	55991
1514	M3				56007				
1515	M3				56008				
1516	M4	128	19	11	56010	±5	56013	55999	55998
1517	M4				56015				
1518	M4				56013				
1519	M5	128	19	12	56029	±1	56029	56015	56014
1520	M5				56030				
1521	M5				56029				
1522	M6	128	19	14	56048	±2	56047	56033	56032
1523	M6				56046				
1524	M6				56048				
1525	M7	128	19	17	56066	±1	56065	56051	56049
1526	M7				56065				
1527	M7				56065				

TABLE 2

MAGNETIC DATA FROM THE FIELD NORTH OF THE ELECTROSCIENCE LABORATORY

TRIAL #	STATION	DAY	HOUR	MINUTE	READING (gammas)	STATION RANGE (gammas)	MEAN OF STATION READING (gammas)	MEAN OF READING ADJUSTED FOR DRIFT BETWEEN TRAVERSES (gammas)	MEAN OF READING CORRECTED FOR DRIFT WITHIN A TRAVERSE (gammas)
1528	M8	128	19	18	56072	±1	56072	56058	56056
1529	M8				56072				
1530	M8				56073				
1531	M9	128	19	20	56076	±1	56076	56062	56060
1532	M9				56077				
1533	M9				56076				
1534	M10	128	19	21	56077	±1	56076	56062	56060
1535	M10				56076				
1536	M10				56076				
1537	M11	128	19	24	56075	±3	56074	56060	56057
1538	M11				56074				
1539	M11				56072				
1540	M12	128	19	26	56067	±2	56066	56052	56049
1541	M12				56065				
1542	M12				56065				
1543	M13	128	19	37	56055	±0	56055	56041	56038
1544	M13				56055				
1545	M13				56055				
1546	M14	128	19	29	56045	±3	56044	56030	56026
1547	M14				56042				
1548	M14				56044				
1549	M15	128	19	30	56027	±0	56027	56013	56009
1550	M15				56027				
1551	M15				55627				

TABLE 2

MAGNETIC DATA FROM THE FIELD NORTH OF THE ELECTROSCIENCE LABORATORY

TRIAL #	STATION	DAY	HOUR	MINUTE	READING (gammas)	STATION RANGE (gammas)	MEAN OF STATION READING (gammas)	MEAN OF READING ADJUSTED FOR DRIFT BETWEEN TRAVERSES (gammas)	MEAN OF READING CORRECTED FOR DRIFT WITHIN A TRAVERSE (gammas)
1552	M16	128	19	32	56009	±2	56010	55996	55992
1553	M16				56011				
1554	M16				56010				
1555	M17	128	19	34	55985	±3	55985	55971	55966
1556	M17				55987				
1557	M17				55984				
1558	M18	128	19	35	55969	±3	55970	55956	55951
1559	M18				55970				
1560	M18				55972				
1561	M19	128	19	38	55968	±2	55968	55954	55949
1562	M19				55967				
1563	M19				55969				
1564	M20	128	19	40	55977	±1	55976	55962	55956
1565	M20				55976				
1566	M20				55976				
1567	M21	128	19	41	55994	±2	55993	55979	55973
1568	M21				55992				
1569	M21				55993				
1570	M22	128	19	42	56007	±2	56006	55992	55986
1571	M22				56007				
1572	M22				56005				
1573	M23	128	19	45	56014	±0	56014	56000	55994
1574	M23				56014				
1575	M23				56014				

TABLE 2

MAGNETIC DATA FROM THE FIELD NORTH OF THE ELECTROSCIENCE LABORATORY

TRIAL #	STATION	DAY	HOUR	MINUTE	READING (gammas)	STATION RANGE (gammas)	MEAN OF STATION READING (gammas)	MEAN OF READING ADJUSTED FOR DRIFT BETWEEN TRAVERSES (gammas)	MEAN OF READING CORRECTED FOR DRIFT WITHIN A TRAVERSE (gammas)
1576	M24	128	19	46	56018	±1	56017	56003	55996
1577	M24				56017				
1578	M24				56017				
1579	M25	128	19	48	56020	±1	56020	56006	55999
1580	M25				56019				
1581	M25				56020				
1582	M26	128	19	50	56021	±1	56021	56007	56000
1583	M26				56022				
1584	M26				56021				
1585	M27	128	19	51	56015	±3	56016	56002	55995
1586	M27				56016				
1587	M27				56018				
1588	M28	128	19	53	56009	±0	56009	55995	55987
1589	M28				56009				
1590	M28				56009				
1591	M29	128	19	54	55997	±1	55998	55984	55976
1592	M29				55998				
1593	M29				55998				
1594	M30	128	19	56	55984	±2	55983	55969	55961
1595	M30				55982				
1596	M30				55983				
1597	M31	128	19	58	55964	±2	55965	55951	55942
1598	M31				55965				
1599	M31				55966				

TABLE 2

MAGNETIC DATA FROM THE FIELD NORTH OF THE ELECTROSCIENCE LABORATORY

TRIAL #	STATION	DAY	HOUR	MINUTE	READING (gammas)	STATION RANGE (gammas)	MEAN OF STATION READING (gammas)	MEAN OF READING ADJUSTED FOR DRIFT BETWEEN TRAVERSES (gammas)	MEAN OF READING CORRECTED FOR DRIFT WITHIN A TRAVERSE (gammas)
1600	M32	128	19	59	55948	±3	55949	55935	55926
1601	M32				55948				
1602	M32				55951				
1603	M33	128	20	2	55937	±2	55938	55924	55915
1604	M33				55939				
1605	M33				55939				
1606	M34	128	20	3	55936	±0	55936	55922	55913
1607	M34				55936				
1608	M34				55936				
1609	M35	128	30	5	55942	±0	55942	55928	55918
1610	M35				55942				
1611	M35				55942				
1612	M36	128	20	6	55952	±2	55951	55937	55927
1613	M36				55952				
1614	M36				55950				
1615	M37	128	20	8	55961	±3	55963	55949	55939
1616	M37				55964				
1617	M37				55963				
1618	M38	128	20	8	55968	±4	55970	55956	55946
1619	M38				55971				
1620	M38				55972				
1621	M39	128	20	12	55976	±1	55975	55961	55950
1622	M39				55975				
1623	M39				55975				

TABLE 2

MAGNETIC DATA FROM THE FIELD NORTH OF THE ELECTROSCIENCE LABORATORY

TRIAL #	STATION	DAY	HOUR	MINUTE	READING (gammas)	STATION RANGE (gammas)	MEAN OF STATION READING (gammas)	MEAN OF READING ADJUSTED FOR DRIFT BETWEEN TRAVERSES (gammas)	MEAN OF READING CORRECTED FOR DRIFT WITHIN A TRAVERSE (gammas)
1624	M40	128	20	12	55977	±1	55977	55963	55952
1625	M40				55977				
1626	M40				55978				
1627	M41	128	20	13	55977	±2	55978	55964	55953
1628	M41				55979				
1629	M41				55978				
1630	M42	128	20	14	55972	±1	55972	55958	55947
1631	M42				55972				
1632	M42				55973				
1633	M43	128	20	15	55965	±2	55965	55951	55940
1634	M43				55964				
1635	M43				55966				
1636	M44	128	20	17	55960	±2	55960	55946	55934
1637	M44				55961				
1638	M44				55959				
1639	M45	128	20	18	55950	±2	55949	55935	55923
1640	M45				55948				
1641	M45				55949				
1642	M46	128	20	19	55943	±3	55945	55931	55919
1643	M46				55946				
1644	M46				55946				
	(Base)	128	20	20	56135	±1	56135	56121	56109
	(Base)				56134				
	(Base)				56135				

TABLE 2

MAGNETIC DATA FROM THE FIELD NORTH OF THE ELECTROSCIENCE LABORATORY

TRIAL #	STATION	DAY	HOUR	MINUTE	READING (gammas)	STATION RANGE (gammas)	MEAN OF STATION READING (gammas)	MEAN OF READING ADJUSTED FOR DRIFT BETWEEN TRAVERSES (gammas)	MEAN OF READING CORRECTED FOR DRIFT WITHIN A TRAVERSE (gammas)
	(Base)	132	13	0	56065	±1	56066	56109	56109
	(Base)				56066				
	(Base)				56066				
1645	N1	132	13	6	56030	±1	56031	56074	56072
1646	N1				56031				
1647	N1				56031				
1648	N2	132	13	8	56022	±2	56021	56064	56062
1649	N2				56020				
1650	N2				56021				
1651	N3	132	13	11	56015	±1	56015	56058	56055
1652	N3				56015				
1653	N3				56016				
1654	N4	132	13	13	56014	±1	56015	56058	56054
1655	N4				56015				
1656	N4				56015				
1657	N5	132	13	15	56016	±2	56017	56060	56055
1658	N5				56018				
1659	N5				56018				
1660	N6	132	13	17	56023	±1	56023	56066	56061
1661	N6				56024				
1662	N6				56023				
1663	N7	132	13	20	56030	±2	56030	56073	56067
1664	N7				56029				
1665	N7				56031				

TABLE 2

MAGNETIC DATA FROM THE FIELD NORTH OF THE ELECTROSCIENCE LABORATORY

TRIAL #	STATION	DAY	HOUR	MINUTE	READING (gammas)	STATION RANGE (gammas)	MEAN OF STATION READING (gammas)	MEAN OF READING ADJUSTED FOR DRIFT BETWEEN TRAVERSES (gammas)	MEAN OF READING CORRECTED FOR DRIFT WITHIN A TRAVERSE (gammas)
1666	N8	132	13	21	56031	±3	56033	56076	56069
1667	N8				56034				
1668	N8				56033				
1669	N9	132	13	23	56036	±2	56037	56080	56073
1670	N9				56036				
1671	N9				56038				
1672	N10	132	13	25	56037	±0	56037	56080	56072
1673	N10				56037				
1674	N10				56037				
1675	N11	132	13	26	56035	±1	56035	56078	56070
1676	N11				56035				
1677	N11				56036				
1678	N12	132	13	28	56032	±1	56033	56076	56067
1679	N12				56033				
1680	N12				56033				
1681	N13	132	13	29	56029	±3	56029	56072	56063
1682	N13				56031				
1683	N13				56028				
1684	N14	132	13	32	56023	±1	56023	56066	56056
1685	N14				56024				
1686	N14				56023				
1687	N15	132	13	34	56017	±3	56016	56059	56048
1688	N15				56014				
1689	N15				56016				

TABLE 2

MAGNETIC DATA FROM THE FIELD NORTH OF THE ELECTROSCIENCE LABORATORY

TRIAL #	STATION	DAY	HOUR	MINUTE	READING (gammas)	STATION RANGE (gammas)	MEAN OF STATION READING (gammas)	MEAN OF READING ADJUSTED FOR DRIFT BETWEEN TRAVERSES (gammas)	MEAN OF READING CORRECTED FOR DRIFT WITHIN A TRAVERSE (gammas)
1690	N16	132	13	36	56004	±4	56006	56049	56037
1691	N16				56008				
1692	N16				56006				
1693	N17	132	13	37	55997	±1	55997	56040	56028
1694	N17				55997				
1695	N17				55996				
1696	N18	132	13	39	55992	±6	55989	56032	56019
1697	N18				55988				
1698	N18				55988				
1699	N19	132	13	41	55986	±1	55985	56028	56015
1700	N19				55985				
1701	N19				55985				
1702	N20	132	13	44	55987	±2	55988	56031	56017
1703	N20				55988				
1704	N20				55989				
1705	N21	132	13	46	55991	±2	55992	56035	56020
1706	N21				55993				
1707	N21				55993				
1708	N22	132	13	47	55997	±1	55997	56040	56025
1709	N22				55996				
1710	N22				55997				
1711	N23	132	13	50	56003	±2	56002	56045	56029
1712	N23				56001				
1713	N23				56001				

TABLE 2

MAGNETIC DATA FROM THE FIELD NORTH OF THE ELECTROSCIENCE LABORATORY

TRIAL #	STATION	DAY	HOUR	MINUTE	READING (gammas)	STATION RANGE (gammas)	MEAN OF STATION READING (gammas)	MEAN OF READING ADJUSTED FOR DRIFT BETWEEN TRAVERSES (gammas)	MEAN OF READING CORRECTED FOR DRIFT WITHIN A TRAVERSE (gammas)
1714	N24	132	13	52	56002	±1	56002	56045	56028
1715	N24				56001				
1716	N24				56002				
1717	N25	132	13	53	56002	±0	56002	56045	56028
1718	N25				56002				
1719	N25				56002				
1720	N26	132	13	55	55999	±1	55999	56042	56024
1721	N26				56000				
1722	N26				55999				
1723	N27	132	13	56	55996	±0	55996	56039	56021
1724	N27				55996				
1725	N27				55996				
1726	N28	132	13	58	55989	±2	55990	56033	56014
1727	N28				55990				
1728	N28				55991				
1729	N29	132	13	59	55983	±2	55982	56025	56006
1730	N29				55982				
1731	N29				55981				
1732	N30	132	14	2	55970	±1	55970	56013	55993
1733	N30				55971				
1734	N30				55970				
1735	N31	132	14	3	55959	±0	55959	56002	55981
1736	N31				55959				
1737	N31				55959				

TABLE 2

MAGNETIC DATA FROM THE FIELD NORTH OF THE ELECTROSCIENCE LABORATORY

TRIAL #	STATION	DAY	HOUR	MINUTE	READING (gammas)	STATION RANGE (gammas)	MEAN OF STATION READING (gammas)	MEAN OF READING ADJUSTED FOR DRIFT BETWEEN TRAVERSES (gammas)	MEAN OF READING CORRECTED FOR DRIFT WITHIN A TRAVERSE (gammas)
1738	N32	132	14	5	55948	±1	55949	55992	55971
1739	N32				55949				
1740	N32				55949				
1741	N33	132	14	6	55938	±4	55940	55983	55961
1742	N33				55941				
1743	N33				55942				
1744	N34	132	14	8	55937	±2	55937	55980	55958
1745	N34				55936				
1746	N34				55938				
1747	N35	132	14	9	55938	±1	55939	55982	55959
1748	N35				55939				
1749	N35				55939				
1750	N36	132	14	12	55943	±2	55942	55985	55961
1751	N36				55941				
1752	N36				55942				
1753	N37	132	14	15	55946	±1	55945	55988	55964
1754	N37				55945				
1755	N37				55945				
1756	N38	132	14	16	55948	±2	55947	55990	55966
1757	N38				55946				
1758	N38				55947				
1759	N39	132	14	17	55947	±2	55948	55991	55967
1760	N39				55948				
1761	N39				55949				

TABLE 2

MAGNETIC DATA FROM THE FIELD NORTH OF THE ELECTROSCIENCE LABORATORY

TRIAL #	STATION	DAY	HOUR	MINUTE	READING (gammas)	STATION RANGE (gammas)	MEAN OF STATION READING (gammas)	MEAN OF READING ADJUSTED FOR DRIFT BETWEEN TRAVERSES (gammas)	MEAN OF READING CORRECTED FOR DRIFT WITHIN A TRAVERSE (gammas)
1762	N40	132	14	20	55947	±0	55947	55990	55966
1763	N40				55947				
1764	N40				55947				
1765	N41	132	14	21	55947	±1	55946	55989	55965
1766	N41				55946				
1767	N41				55946				
1768	N42	132	14	23	55939	±2	55940	55983	55959
1769	N42				55940				
1770	N42				55941				
1771	N43	132	14	25	55936	±1	55936	55979	55955
1772	N43				55936				
1773	N43				55935				
1774	N44	132	14	26	55929	±1	55930	55973	55949
1775	N44				55930				
1776	N44				55930				
1777	N45	132	14	27	55919	±0	55919	55962	55938
1778	N45				55919				
1779	N45				55919				
1780	N46	132	14	28	55909	±1	55909	55952	55928
1781	N46				55910				
1782	N46				55909				
	(Base)	132	14	30	56089	±2	56090	56133	56109
	(Base)				56091				
	(Base)				56090				

TABLE 2

MAGNETIC DATA FROM THE FIELD NORTH OF THE ELECTROSCIENCE LABORATORY

TRIAL #	STATION	DAY	HOUR	MINUTE	READING (gammas)	STATION RANGE (gammas)	MEAN OF STATION READING (gammas)	MEAN OF READING ADJUSTED FOR DRIFT BETWEEN TRAVERSES (gammas)	MEAN OF READING CORRECTED FOR DRIFT WITHIN A TRAVERSE (gammas)
	(Base)	132	17	5	56118	±1	56119	56109	
	(Base)				56119				
	(Base				56119				
1783	01	132	17	7	56110	±2	56111	56101	
1784	01				56112				
1785	01				56112				
1786	02	132	17	9	56110	±1	56111	56101	
1787	02				56111				
1788	02				56111				
1789	03	132	17	11	56109	±2	56109	56099	
1790	03				56108				
1791	03				56110				
1792	04	132	17	12	56108	±1	56108	56098	
1793	04				56108				
1794	04				56109				
1795	05	132	17	14	56109	±3	56107	56097	
1796	05				56106				
1797	05				56107				
1798	06	132	17	16	56105	±1	56105	56095	
1799	06				56105				
1800	06				56106				
1801	07	132	17	17	56106	±1	56106	56096	
1802	07				56105				
1803	07				56106				

TABLE 2

MAGNETIC DATA FROM THE FIELD NORTH OF THE ELECTROSCIENCE LABORATORY

TRIAL #	STATION	DAY	HOUR	MINUTE	READING (gammas)	STATION RANGE (gammas)	MEAN OF STATION READING (gammas)	MEAN OF READING ADJUSTED FOR DRIFT BETWEEN TRAVERSES (gammas)	MEAN OF READING CORRECTED FOR DRIFT WITHIN A TRAVERSE (gammas)
1804	08	132	17	19	56103	±1	56104	56094	
1805	08				56104				
1806	08				56104				
1807	09	132	17	20	56102	±0	56102	56092	
1808	09				56102				
1809	09				56102				
1810	010	132	17	22	56101	±1	56101	56091	
1811	010				56100				
1812	010				56101				
1813	011	132	17	27	56095	±4	56098	56088	
1814	011				56099				
1815	011				56099				
1816	012	132	17	29	56097	±3	56095	56085	
1817	012				56095				
1818	012				56094				
1819	013	132	17	30	56090	±1	56091	56081	
1820	013				56091				
1821	013				56091				
1822	014	132	17	32	56088	±0	56088	56078	
1823	014				56088				
1824	014				56088				
1825	015	132	17	34	56083	±3	56084	56074	
1826	015				56083				
1827	015				56086				

TABLE 2

MAGNETIC DATA FROM THE FIELD NORTH OF THE ELECTROSCIENCE LABORATORY

TRIAL #	STATION	DAY	HOUR	MINUTE	READING (gammas)	STATION RANGE (gammas)	MEAN OF STATION READING (gammas)	MEAN OF READING ADJUSTED FOR DRIFT BETWEEN TRAVERSES (gammas)	MEAN OF READING CORRECTED FOR DRIFT WITHIN A TRAVERSE (gammas)
1828	016	132	17	25	56079	±2	56080	56070	
1829	016				56081				
1830	016				56080				
1831	017	132	17	37	56077	±1	56077	56067	
1832	017				56078				
1833	017				56077				
1834	018	132	17	39	56073	±1	56074	56064	
1835	018				56074				
1836	018				56074				
1837	019	132	17	40	56072	±0	56072	56062	
1838	019				56072				
1839	019				56072				
1840	020	132	17	42	56067	±1	56067	56057	
1841	020				56068				
1842	020				56067				
1843	021	132	17	44	56066	±1	56066	56056	
1844	021				56066				
1845	021				56067				
1846	022	132	17	46	56063	±1	56063	56063	
1847	022				56064				
1848	022				56063				
1849	023	132	17	47	56061	±1	56060	56050	
1850	023				56060				
1851	023				56060				

TABLE 2

MAGNETIC DATA FROM THE FIELD NORTH OF THE ELECTROSCIENCE LABORATORY

TRIAL #	STATION	DAY	HOUR	MINUTE	READING (gammas)	STATION RANGE (gammas)	MEAN OF STATION READING (gammas)	MEAN OF READING ADJUSTED FOR DRIFT BETWEEN TRAVERSES (gammas)	MEAN OF READING CORRECTED FOR DRIFT WITHIN A TRAVERSE (gammas)
1852	024	132	17	49	56057	±2	56056	56046	
1853	024				56055				
1854	024				56056				
1855	025	132	17	50	56054	±0	56054	56044	
1856	025				56054				
1857	025				56054				
1858	026	132	17	52	56051	±1	56051	56041	
1859	026				56052				
1860	026				56051				
1861	027	132	17	34	56049	±1	56049	56039	
1862	027				56049				
1863	027				56048				
1864	028	132	17	55	56044	±2	56045	56035	
1865	028				56044				
1866	028				56046				
1867	029	132	17	57	56043	±1	56043	56033	
1868	029				56043				
1869	029				56044				
1870	030	132	17	58	56038	±0	56038	56028	
1871	030				56038				
1872	030				56038				
1873	031	132	18	0	56035	±1	56035	56025	
1874	031				56035				
1875	031				56036				

TABLE 2

MAGNETIC DATA FROM THE FIELD NORTH OF THE ELECTROSCIENCE LABORATORY

TRIAL #	STATION	DAY	HOUR	MINUTE	READING (gammas)	STATION RANGE (gammas)	MEAN OF STATION READING (gammas)	MEAN OF READING ADJUSTED FOR DRIFT BETWEEN TRAVERSES (gammas)	MEAN OF READING CORRECTED FOR DRIFT WITHIN A TRAVERSE (gammas)
1876	032	132	18	2	56031	±0	56031	56021	
1877	032				56031				
1878	032				56031				
1879	033	132	18	4	56027	±2	56027	56017	
1880	033				56028				
1881	033				56026				
1882	034	132	18	6	56022	±1	56023	56013	
1883	034				56023				
1884	034				56023				
1885	035	132	18	7	56017	±2	56017	56007	
1886	035				56018				
1887	035				56016				
1888	036	132	18	9	56014	±1	56014	56004	
1889	036				56014				
1890	036				56015				
1891	037	132	18	12	56010	±1	56010	56000	
1892	037				56010				
1893	037				56011				
1894	038	132	18	13	56007	±1	56007	55997	
1895	038				56006				
1896	038				56007				
1897	039	132	18	15	56002	±1	56001	55991	
1898	039				56001				
1899	039				56001				

TABLE 2

MAGNETIC DATA FROM THE FIELD NORTH OF THE ELECTROSCIENCE LABORATORY

TRIAL #	STATION	DAY	HOUR	MINUTE	READING (gammas)	STATION RANGE (gammas)	MEAN OF STATION READING (gammas)	MEAN OF READING ADJUSTED FOR DRIFT BETWEEN TRAVERSES (gammas)	MEAN OF READING CORRECTED FOR DRIFT WITHIN A TRAVERSE (gammas)
1900	040	132	18	16	55997	±1	55997	55987	
1901	040				55998				
1902	040				55997				
1903	041	132	18	17	55991	±1	55991	55981	
1904	041				55991				
1905	041				55992				
1906	042	132	18	19	55985	±1	55985	55975	
1907	042				55984				
1908	042				55985				
1909	043	132	18	21	55977	±1	55977	55967	
1910	043				55977				
1911	043				55976				
1912	044	132	18	22	55966	±3	55968	55958	
1913	044				55969				
1914	044				55969				
1915	045	132	18	24	55959	±1	55959	55949	
1916	045				55959				
1917	045				55958				
1918	046	132	18	26	55948	±1	55948	55938	
1919	046				55948				
1920	046				55947				
	(Base)	132	18	29	56121	±1	56121	56111	
	(Base)				56121				
	(Base)				56122				

INTERPRETATION OF ANOMALIES

The magnetic field of a pipe is the resultant vector of its induced magnetization and its permanent magnetization. The induced magnetization depends on the intensity of the inducing field, which is that of the earth, and the direction of the earth's magnetic field. The permanent magnetication depends on the orientation of the pipe as it solidified below the Curie temperature.

In Franklin County, Ohio, in the year 1981, the magnetic inclination is about 70° north and the magnetic declination is about 4° west of north.

For Row A, traverses were made west to east, with the first station A1, at a distance of 0 feet. The easternmost station of A41 is at a distance of 80 feet from A1. All of the other traverses are similarly made from west to east.

Table 3 shows the correspondence between each station column and its distance from the initial station of a given traverse.

In the Southern Part of the field north of the Electroscience Laboratory the pipes lie along a north-south axis at distances of 10 feet, 30 feet and 60 feet.

TABLE 3

CORRESPONDENCE BETWEEN EACH STATION COLUMN AND ITS DISTANCE FROM THE INITIAL STATION OF A GIVEN TRAVERSE, FOR THE AREA IN THE FIELD NORTH OF THE ELECTROSCIENCE LABORATORY.

STATION COLUMN	DISTANCE IN FEET	STATION COLUMN	DISTANCE IN FEET
1	0	24	46
2	2	25	48
3	4	26	50
4	6	27	52
5	8	28	54
6	10	29	56
7	12	30	58
8	14	31	60
9	16	32	62
10	18	33	64
11	20	34	66
12	22	35	68
13	24	36	70
14	26	37	72
15	28	38	74
16	30	39	76
17	32	40	78
18	34	41	80
19	36	42	82
20	38	43	84
21	40	44	86
22	42	45	88
23	44	46	90

TABLE 4

CORRESPONDENCE BETWEEN EACH STATION COLUMN AND ITS DISTANCE FROM THE INITIAL STATION OF A GIVEN TRAVERSE, LISTING THE POSITIONS DIRECTLY ABOVE, THE LONG AXIS GOING THROUGH THE FERROMAGNETIC PIPES, IN THE AREA OF THE NORTHERN PART.

STATION COLUMN	DISTANCE IN FEET
6	10
21	40
36	70

TABLE 5

CORRESPONDENCE BETWEEN EACH STATION COLUMN AND ITS DISTANCE FROM THE INITIAL STATION OF A GIVEN TRAVERSE, LISTING THE POSITIONS DIRECTLY ABOVE, THE LONG AXIS GOING THROUGH THE FERROMAGNETIC PIPES, IN THE AREA OF THE SOUTHERN PART.

STATION COLUMN	DISTANCE IN FEET
6	10
16	30
31	60

Each horizontal cylindrical pipe is considered to be a line of dipoles.

When the magnetic flux of the pipes reinforce the earth's magnetic field, a positive anomaly results. When the magnetic flux of the pipes opposes the earth's magnetic field, a negative anomaly results. When the tangent to the lines of force of the pipes are perpendicular to the direction of the earth's magnetic field, the anomaly is zero. Theoretically, in the northern hemisphere when the magnetism is solely of the induced type, an anomaly has a high (i.e. positive), south over the center of a N-S oriented horizontal pipe and a low (i.e. negative), north over the center of the pipe, as shown by Figure 5.

The variation in anomaly width is due to the distance between the center of the magnetometer sensor and the center of the source. As the distance between the center of the sensor (which was 5 feet 6 inches above ground level) and the center of the pipes increased the anomaly width (caused by the pipe) increased.

The relative amplitude of the anomalies, caused by the pipes were due to the earth's field direction, being greater here than at a lower magnetic latitude and less than at a higher magnetic latitude, the configuration of the source and the amount of permanent magnetization in the pipes determine the relative amplitude.

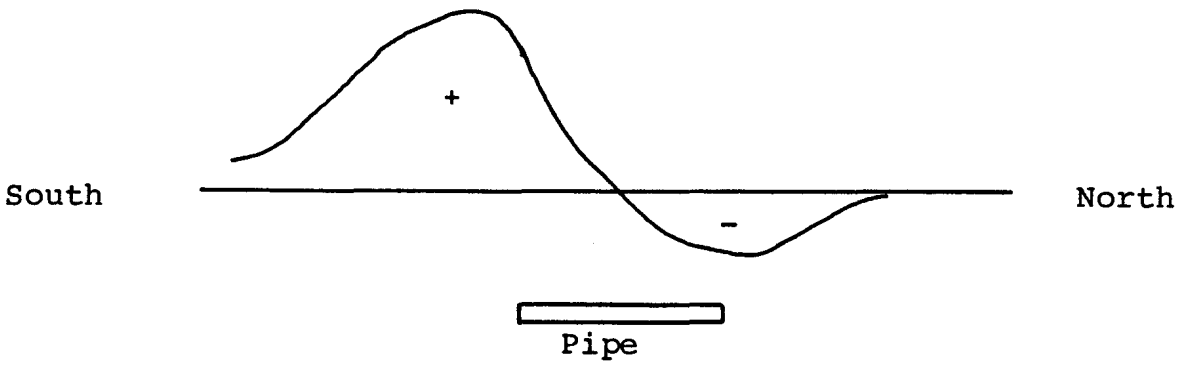


Figure 5. Theoretical magnetic profile of a North-South traverse over a horizontal pipe with its longest axis oriented North-South. (Adapted from Noltimier, 1981)

The maximum amplitude is defined as the distance from the regional field, which is considered to be the locale-zero. Maximum amplitude depends on the distance from the center of the sensor to the center of the pipes, with the maximum amplitude decreasing from pipes of the same size but buried at a greater depth. The maximum amplitude also depends on the amount of ferromagnetic material, increasing with the increase in ferromagnetic pipe material. Maximum amplitude also depends on the configuration of the pipe with the larger amplitude occurring when the permanent magnetization and the induced magnetization have the same magnetization direction. Since the induced magnetization would necessarily be in the same direction as the earth's magnetic field, this would mean the permanent magnetization likewise would be in the same direction of the earth's magnetic field to cause a maximum high amplitude.

The magnetic profile of Row A (see Figure 6) does not show noticeable anomalies caused by the three 1-foot pipes. Row A shows the regional field having a general trending decrease in magnitude from west to east. An anomaly low which occurs at a distance of 2 and 4 feet may be due to experimental apparatus which was set up by Ohio State University researchers, west of A1.

Row B (see Figure 7) shows the same general trend as Row A with the regional field decreasing from west to east. Row B is 5 feet 6 inches north of Row A and in this distance

the regional field shows about a 25 gamma increase at each corresponding station across from Row A.

Row C (see Figure 8) shows the same general trending regional field as Row A and Row B which decreases going west to east with a high located at the 30 foot location. Comparing this high at 30 feet with Row A and Row B, it does not seem to be caused by the 1-foot pipes but probably is caused by the 3-foot pipe north of this location. Row C shows a regional field increase in magnitude from Row B of about 30 gammas.

Row D (see Figure 9) shows a small relative high at 4 feet which is probably not due to a pipe. At 30 feet there is a relative high due to the center 3-foot pipe. The relative low around the 10 foot location is probably due to the western 3-foot pipe. The near horizontal part of the profile between 64 and 70 feet is probably strongly influenced by the permanent magnetization of the eastern 3-foot pipe.

Row E (see Figure 10) shows a relative high directly at the 10 foot location correspondingly caused by the eastern 3-foot pipe. There is a small high at about the 30 foot location showing a much smaller anomaly pattern than at the 30 foot location of Row D. Row E shows a relative high about 4 feet west of the 60 foot location and is probably due to the eastern 3-foot pipe.

Row F (see Figure 11) shows the same similar curve as

Row E with a high at 10 foot, 32 foot and 60 foot. The high at 10 foot corresponds to the western 3-foot length pipe. The high at 32 foot corresponds to the center 3-foot length pipe, and the high at 60 foot corresponds to the eastern 3-foot length pipe. Row F has about a 30 foot increase in the magnitude of the regional field from Station E1 to Station F1. Row F has about a 35 foot increase over Row E in absolute amplitude at the 10 foot and 30 foot highs and about a 55 foot increase in absolute amplitude at the 60 foot high over Row E. The small relative high and low anomalies between 42 feet and 50 feet are not caused by the pipes, but what they are caused by I do not know. It could possibly be caused by a small concentration of nearby buried ferromagnetic rocks or more likely ferromagnetic pipe fittings.

The anomaly pattern of Row G (see Figure 12) will be used for both qualitative and quantitative interpretation in the following description. Row G has a maximum amplitude at the 10 foot location which corresponds to Station G6. At the point of maximum amplitude the mean of station reading adjusted for drift between traverses with 56208 gammas. This is a 164 gamma increase from the 56044 reading at Station G1, which is only 10 feet from Station G6. The high amplitudes are at larger values along Row G than along Row H and Row I which cross directly over the 5-foot pipes or Row J which is north of the 5-foot pipes because the direction of the induced magnetization is greater south

of the center of the pipe and decreases to the regional field over the pipe as shown by Row H and continues to decrease resulting in anomaly lows north of the center of the pipe as shown by Row I and Row J.

The anomaly high at 10 foot corresponds directly to the axis along the western 5-foot pipe.

The 30 foot location corresponds to Station G16, this shows the maximum amplitude occurring directly along the axis of the center 5-foot pipe. The 60 foot location corresponds to Station G31 and likewise the maximum amplitude corresponds to the eastern 5-foot pipe directly along its axis line.

The anomaly at 10 foot is about 148 gammas above the regional field. The anomaly at 30 foot is about 95 gammas above the regional field. The anomaly at 60 foot is about 64 gammas above the regional field. These three anomalies show how the maximum anomaly amplitude decreases with depth, because all three pipes causing their corresponding anomalies differ only in their distances from magnetometer sensor.

The anomaly width at the 10 foot location is about 20 feet. The anomaly width at the 30 foot location is about 24 feet. The anomaly width at the 60 foot location is over 30 feet. This shows the anomaly width increasing due solely to the depth of the source since the three 5-foot pipes causing the three corresponding anomalies differ only in the distance to the magnetometer sensor.

For simplification, if the magnetic field at which the pipes are located (70° inclination) is assumed to be vertical, the half-width rule can be applied. This rule gives an approximate correspondence between the anomaly width and the depth to the source causing the anomaly. For a horizontal pipe, the depth is two times the half-width. The half-width is defined as the horizontal distance between the maximum point of the anomaly and the point where the value is exactly one-half the maximum value. For the anomaly at the 10 foot location of Row G, the half-width is 4 feet and doubling this gives a value of 8 feet as the theoretical distance from the center of the sensor to the center of the pipe, compared to the actual distance of 8 feet and 3 inches, which is a very close agreement to the theoretical value. For the anomaly at 30 foot location of Row G, the half-width is about 5 feet and doubling this gives a value of 10 feet from the center of the sensor to the center of the pipe compared to the actual distance of 9 feet and 11 inches, which is also in very close agreement to the theoretical value. For the anomaly at the 60 foot location of Row G, the half-width is about 5 feet and 3 inches and doubling this gives a value of 10 feet and 6 inches as the theoretical distance from the center of the sensor to the center of the pipe, compared to the actual value of 11 feet and 9 inches which is in fairly close agreement with the theoretical value.

Row H did not give a valid reading for Stations H5, H6,

and H7. This was caused by the magnetic gradient being too large for the magnetometer to accurately count the precession frequency, which in turn was due to the close proximity between the sensor and the 5-foot pipe. A general trending low occurs at the 30 foot location, and a relative high amplitude but with an absolute amplitude of near zero occurs at the 60 foot location (see Figure 13).

Row I (see Figure 14) shows absolute low amplitudes at 10 feet, 30 feet and at 60 feet and corresponds very closely to the reverse image below the regional gradient as that of Row G.

For J (see Figure 15) shows absolute low at the 10 foot, 30 foot and 62 foot locations similar to Row G but with much smaller anomaly amplitudes.

In the Northern Part, the axis through the 10-foot length pipe occurs at the distances of 10 feet, 40 feet, and 70 feet. For Row K (see Figure 16), an anomaly high occurs at 4 feet, 32 feet and 64 feet which is west of the axis of the three pipes. The maximum amplitudes occuring at these locations must be due to a strong permanent magnetization in the westward direction. The small anomaly at 46 feet corresponds to Station K24. At this station the first reading taken corresponding to trial number 1300 is 55988 gammas. The second reading, corresponding to trial number 1301, is 55989 gammas and the third reading, corresponding to trial number 1302, is 55999 gammas. The range of these numbers

is 11 gammas. The first two readings at this Station K24 differ only by 1 gamma but the third reading differs from the two by 11 and 10 gammas respectively; therefore, I think the larger value of the third reading at Station K24 is due to a micropulsation which causes the mean station reading to be larger than it would have been and thus resulting in the small anomaly at the 46 foot location at Station K24.

Row L (see Figure 17) has a low at 4 feet, 34 feet and 64 feet, caused by the resultant magnetism of the three corresponding pipes, opposing the flux of the earth's magnetic field.

Row M (see Figure 18) shows a similar signature as Row L with lows occurring at 4 feet, 36 feet and 66 feet. The low at the 4 foot location of Row M has a smaller anomaly amplitude than the 4 foot location of Row L. The low at the 30 foot location of Row M is not quite as low in amplitude as the 34 foot location of Row L, but the low of amplitude of the 66 foot location is greater than the 64 foot low in amplitude for Row L.

Row N (see Figure 19) shows a decrease in amplitude compared to Row M at each of the three minimum amplitudes at the 6 foot location, the 36 foot location and the 66 foot location.

Row O (see Figure 20) shows a non-anomalous magnetic profile. It does, however, show the regional field decreasing from the mean of station reading adjusted for drift

between traverses, change from 56101 gammas to 55938 gammas in a distance of 90 feet.

The anomaly due to the pipe at the Columbia Gas Area is shifted with its maximum amplitude west of north due to its orientation. A calculated depth, using the half-width rules of 5 feet corresponds to the actual depth of between 8 feet and 6 inches and 9 feet and 6 inches. The strong magnetic gradient over the railroad tracks resulted in invalid readings. The railroad tracks have a strong permanent magnetization whose flux opposes that of the earth's field resulting in the negative anomaly just west of the tracks.

Magnetic profiles were drawn over the long axis of the pipes resulting in the Magnetic Profile of Columns 6, 16 and 31 in the Southern Part, and Magnetic Profiles of Columns 6, 21 and 36 in the Northern Part (see Figure 22 through Figure 27).

The stations selected for the construction of the total magnetic field contour maps for both the Southern Part and the Northern Part were chosen so that they would be equally spaced in plan view (see Plate 1 and Plate 2).

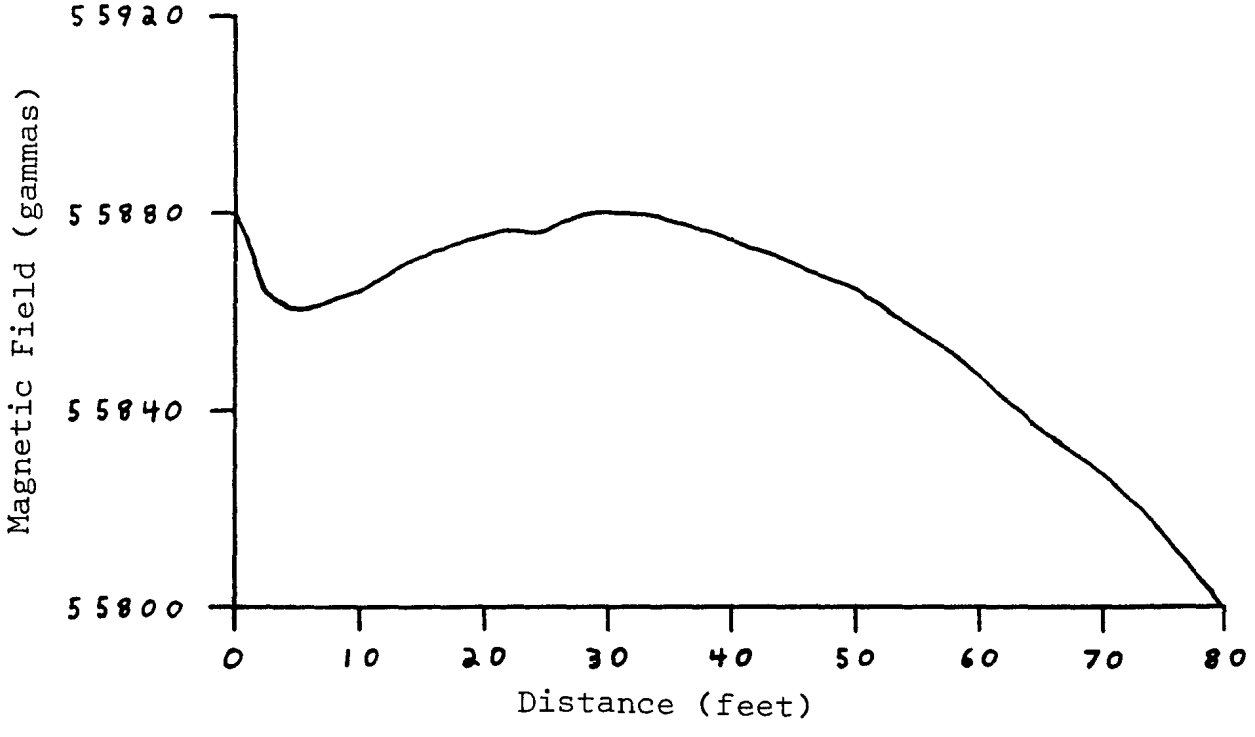


Figure 6. Magnetic profile of Row A.

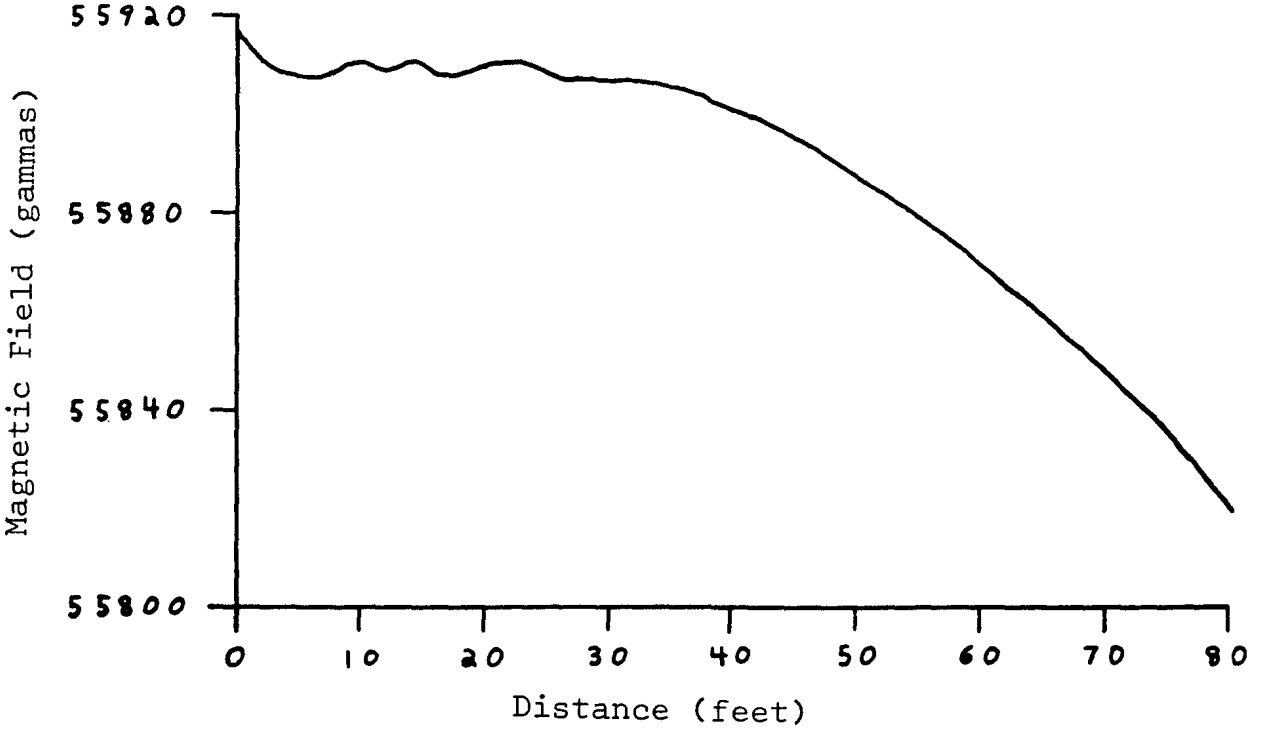


Figure 7. Magnetic profile of Row B.

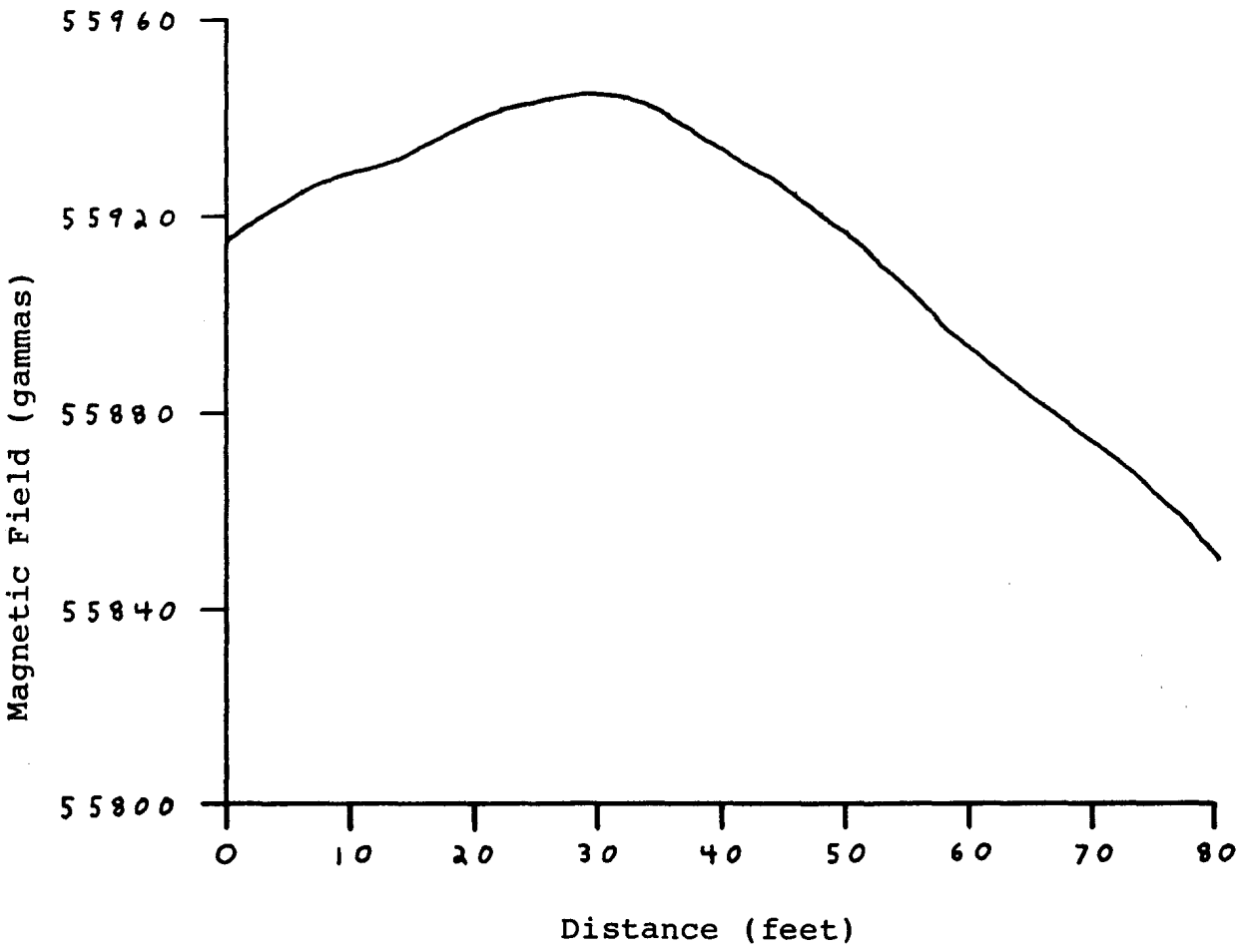


Figure 8. Magnetic profile of Row C.

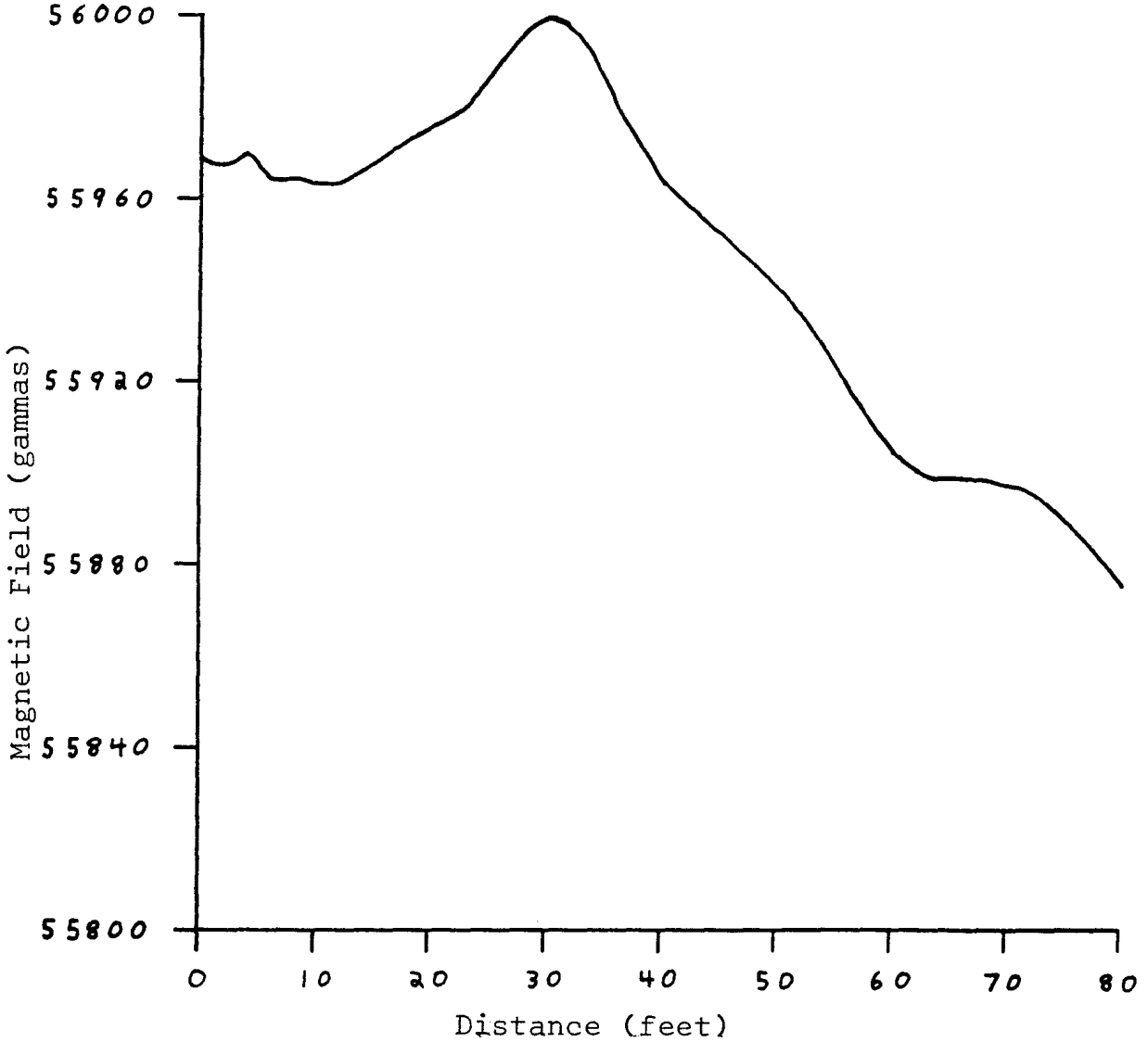


Figure 9. Magnetic profile of Row D.

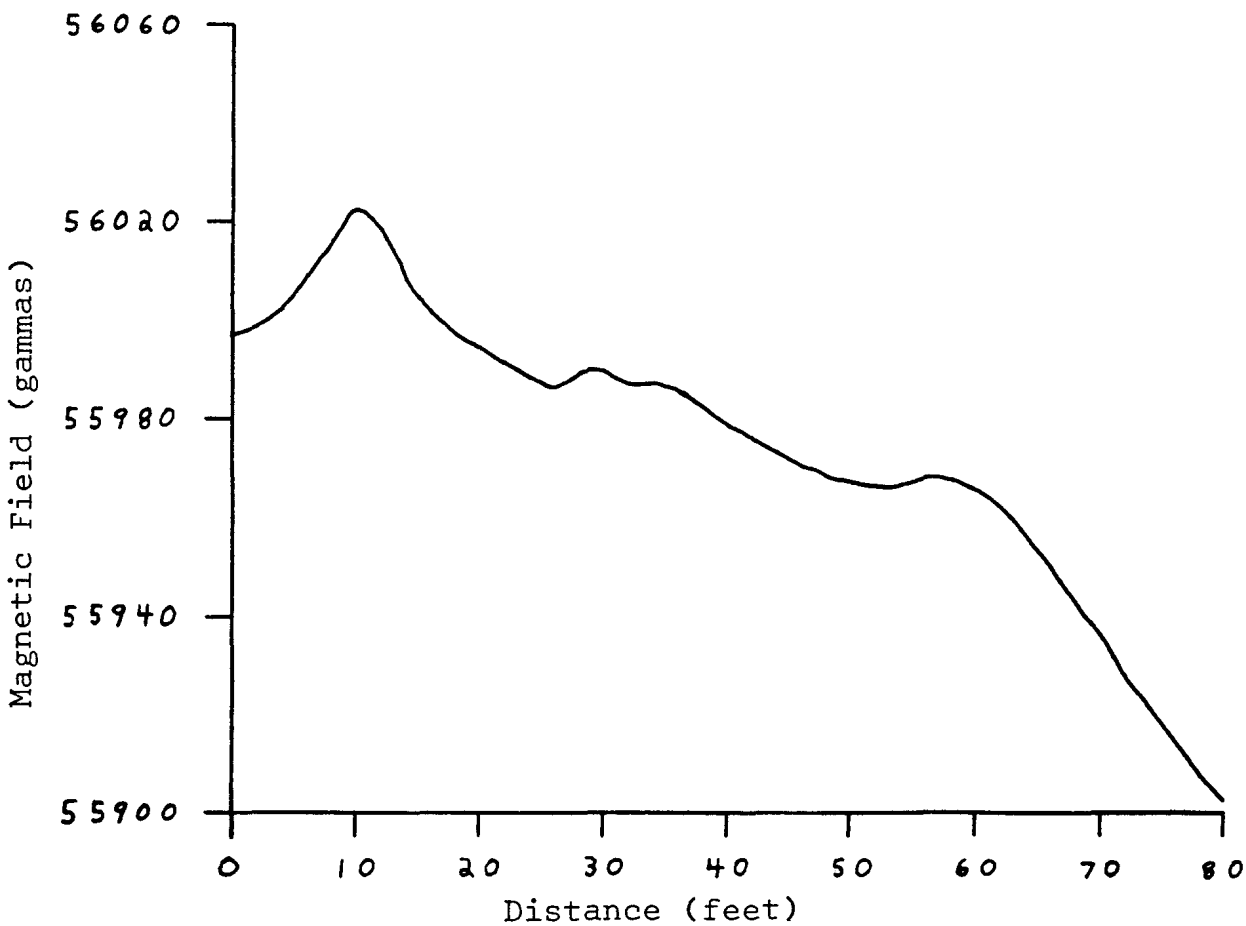


Figure 10. Magnetic profile of Row E.

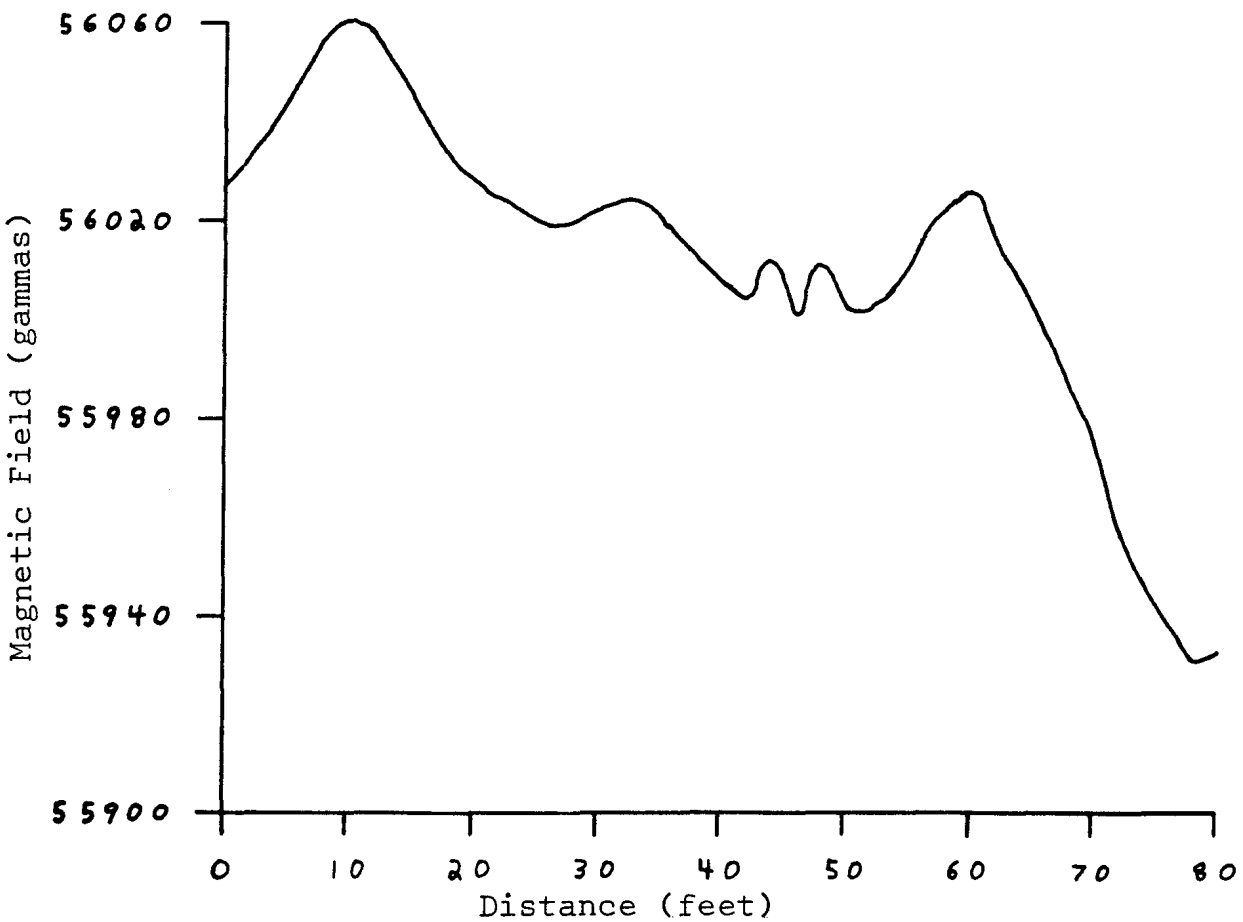


Figure 11. Magnetic profile of Row F.

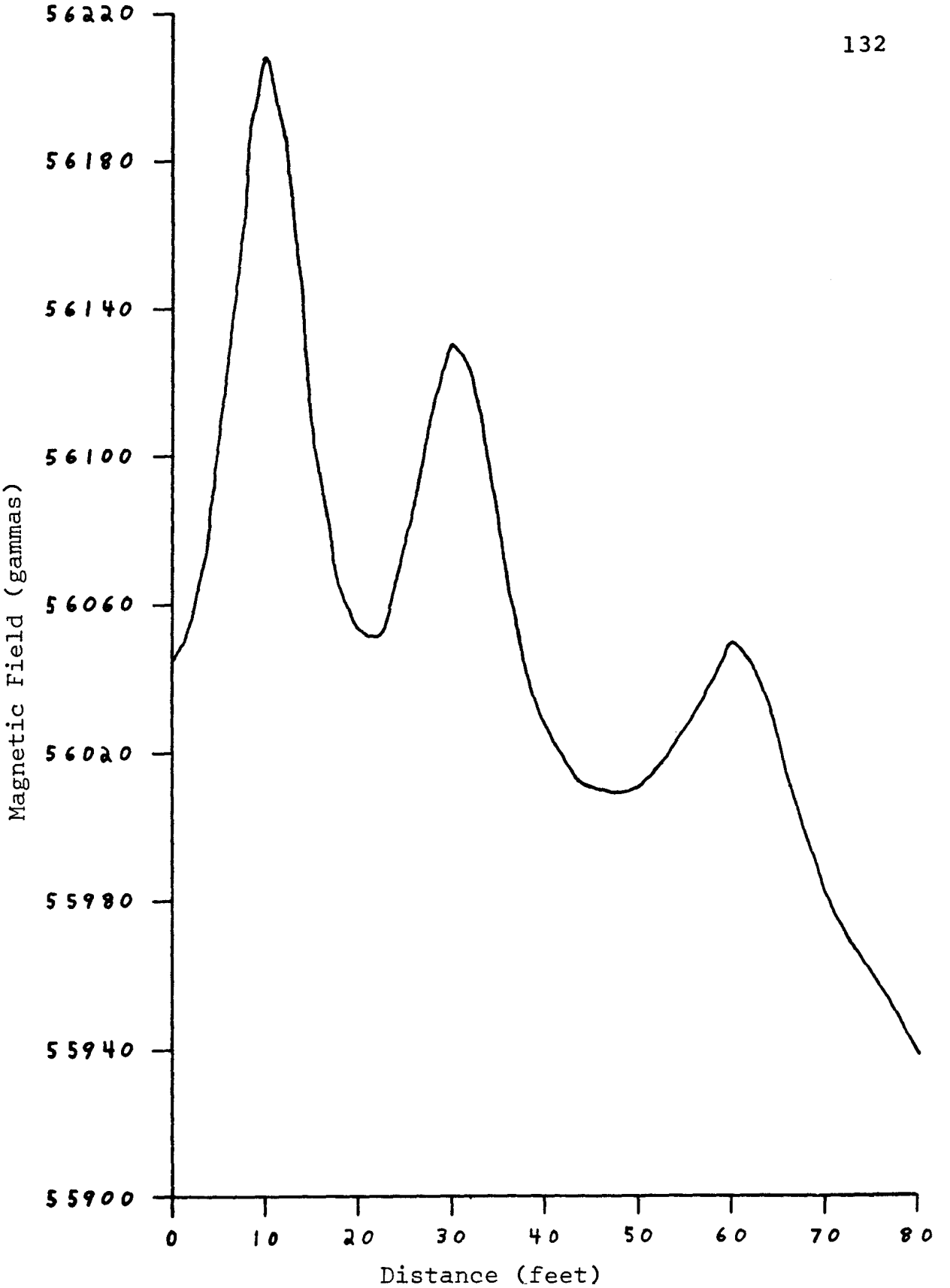


Figure 12. Magnetic profile of Row G.

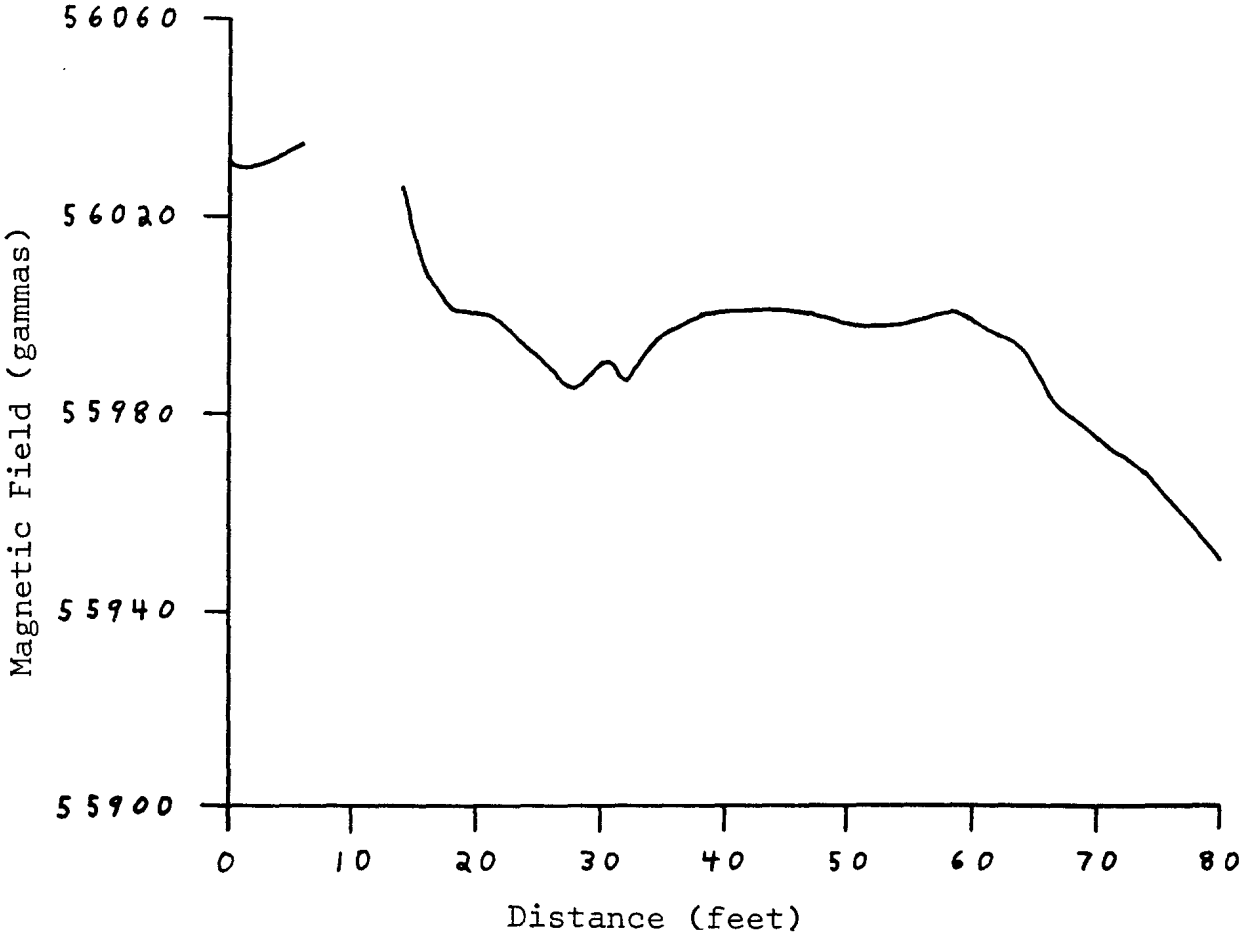


Figure 13. Magnetic profile of Row H.

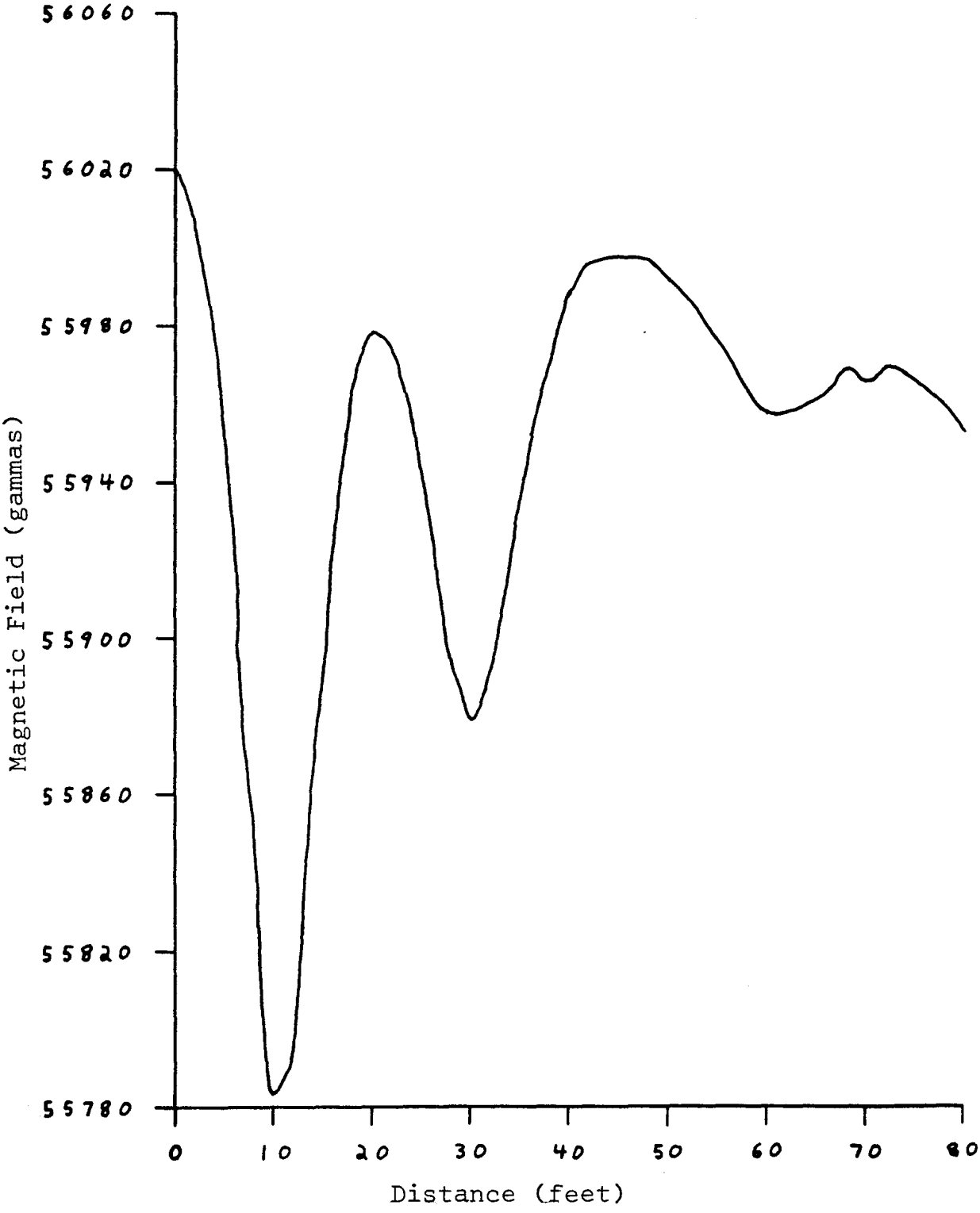


Figure 14. Magnetic profile of Row I.

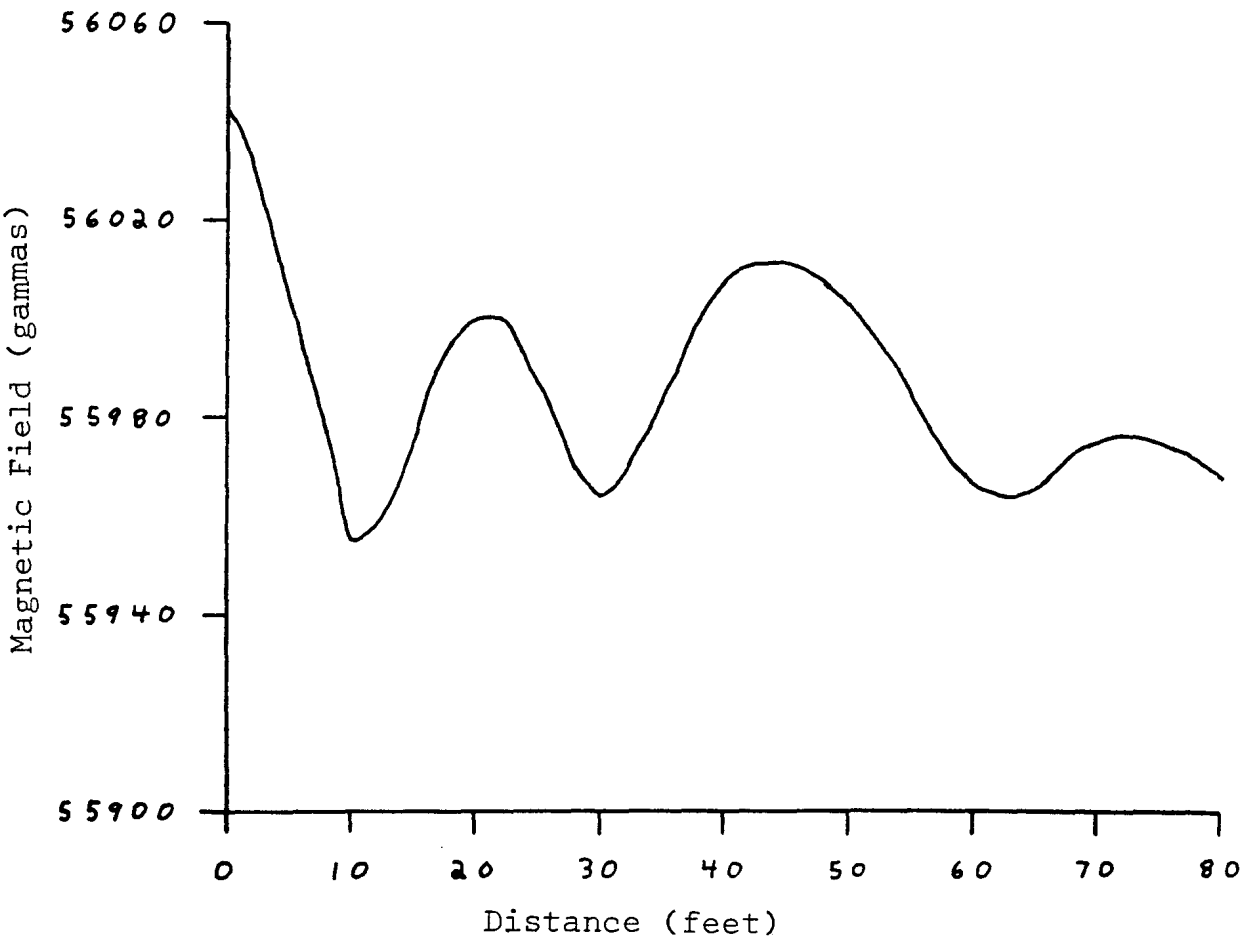


Figure 15. Magnetic profile of Row J.

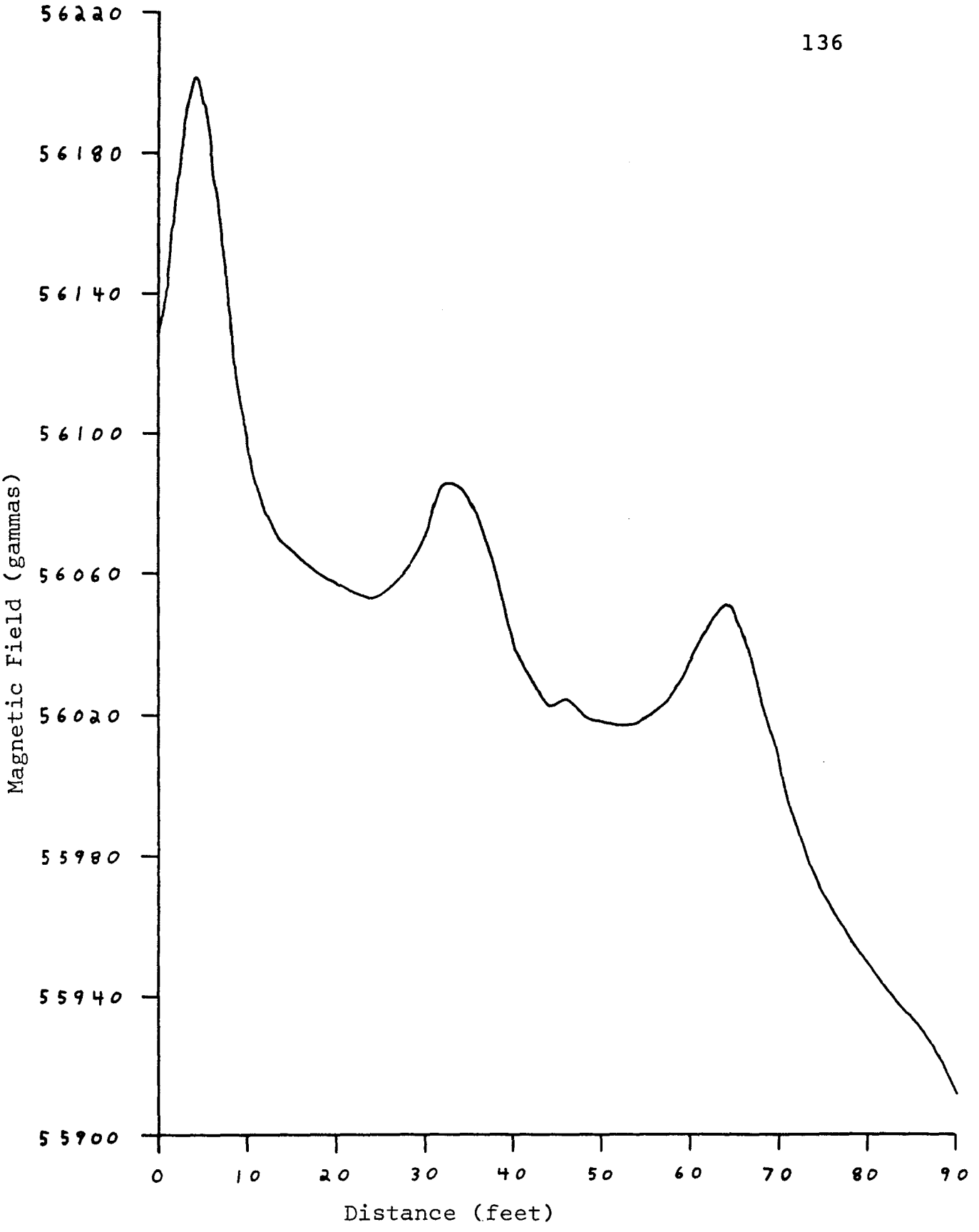


Figure 16. Magnetic profile of Row K.

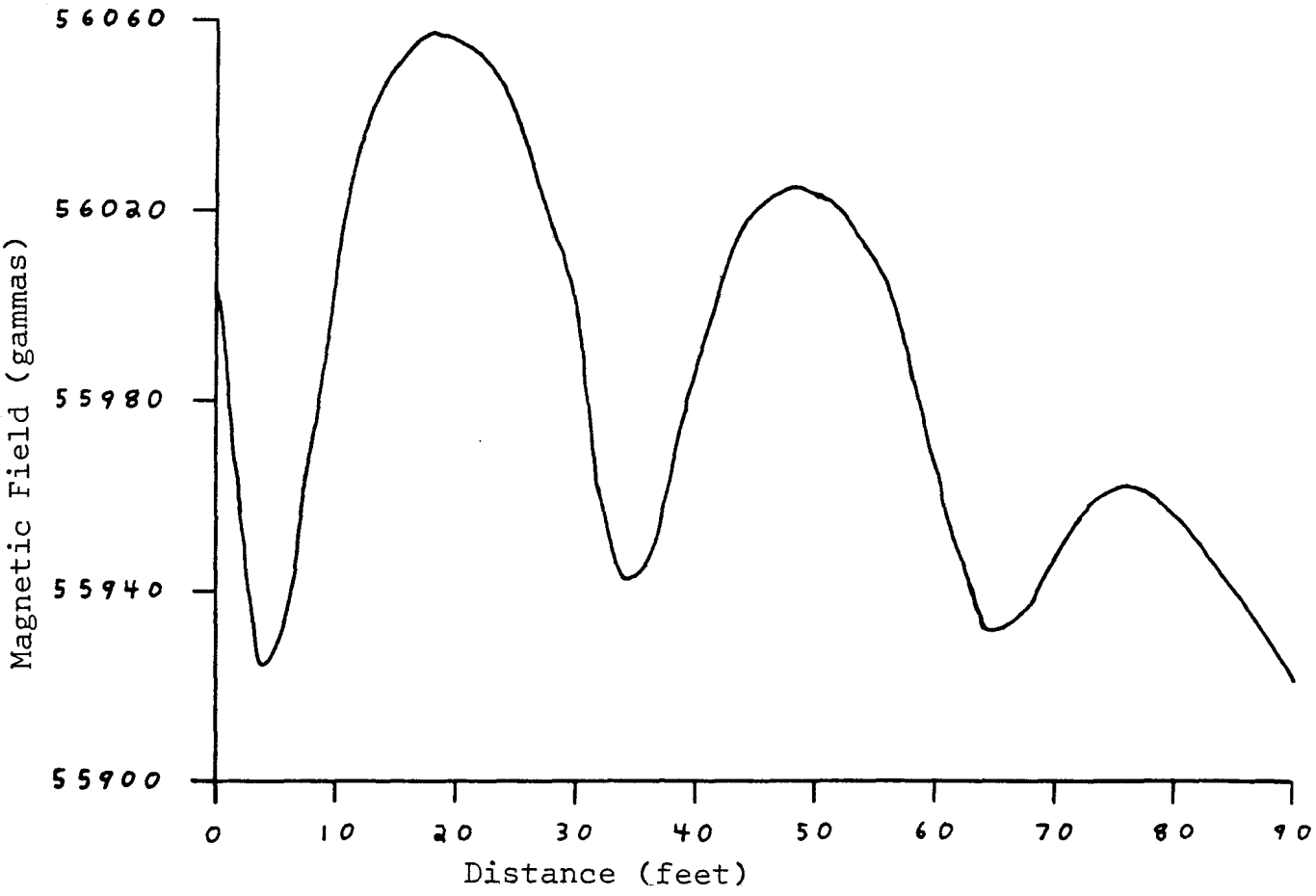


Figure 17. Magnetic profile of Row L.

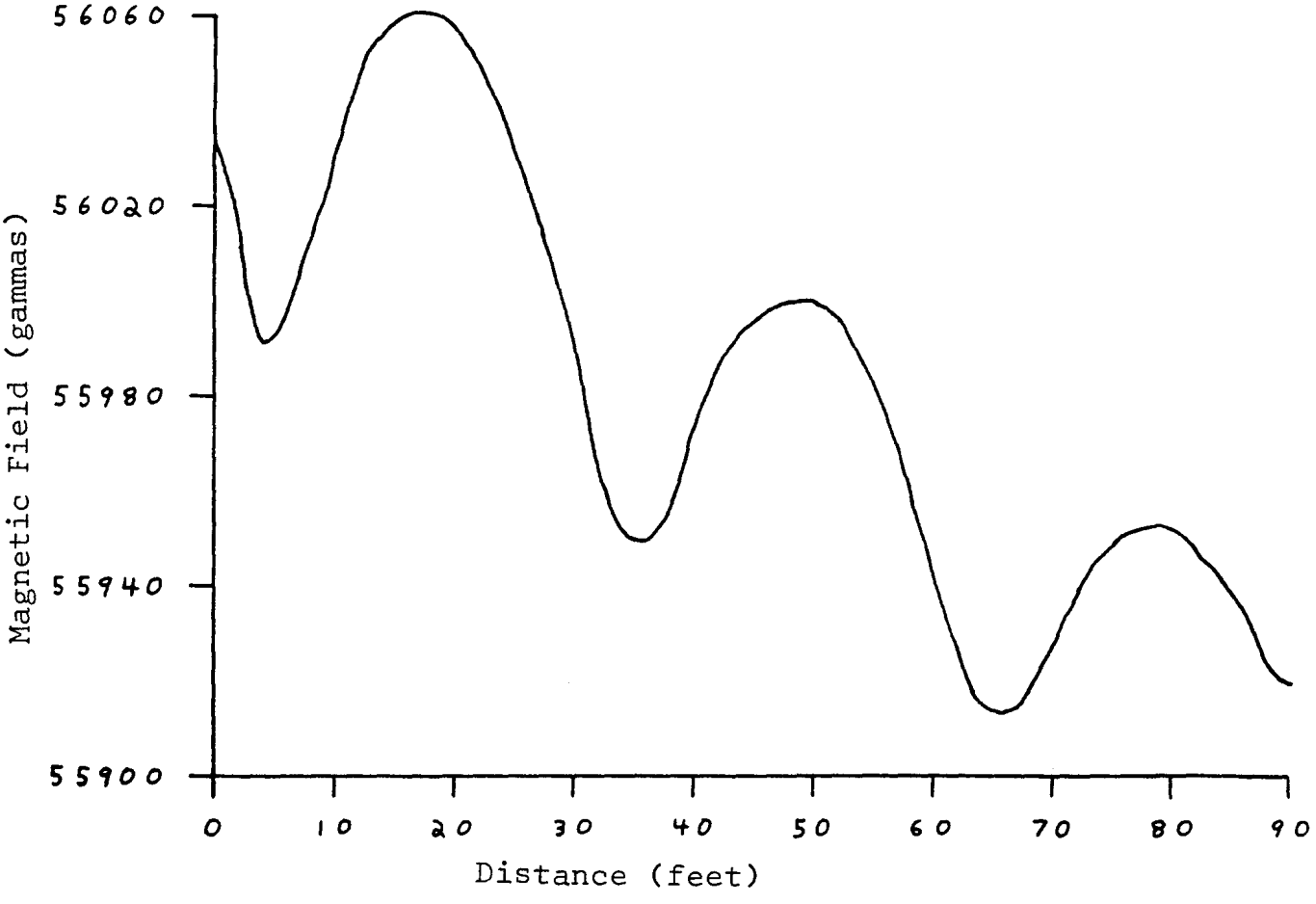


Figure 18. Magnetic profile of Row M.

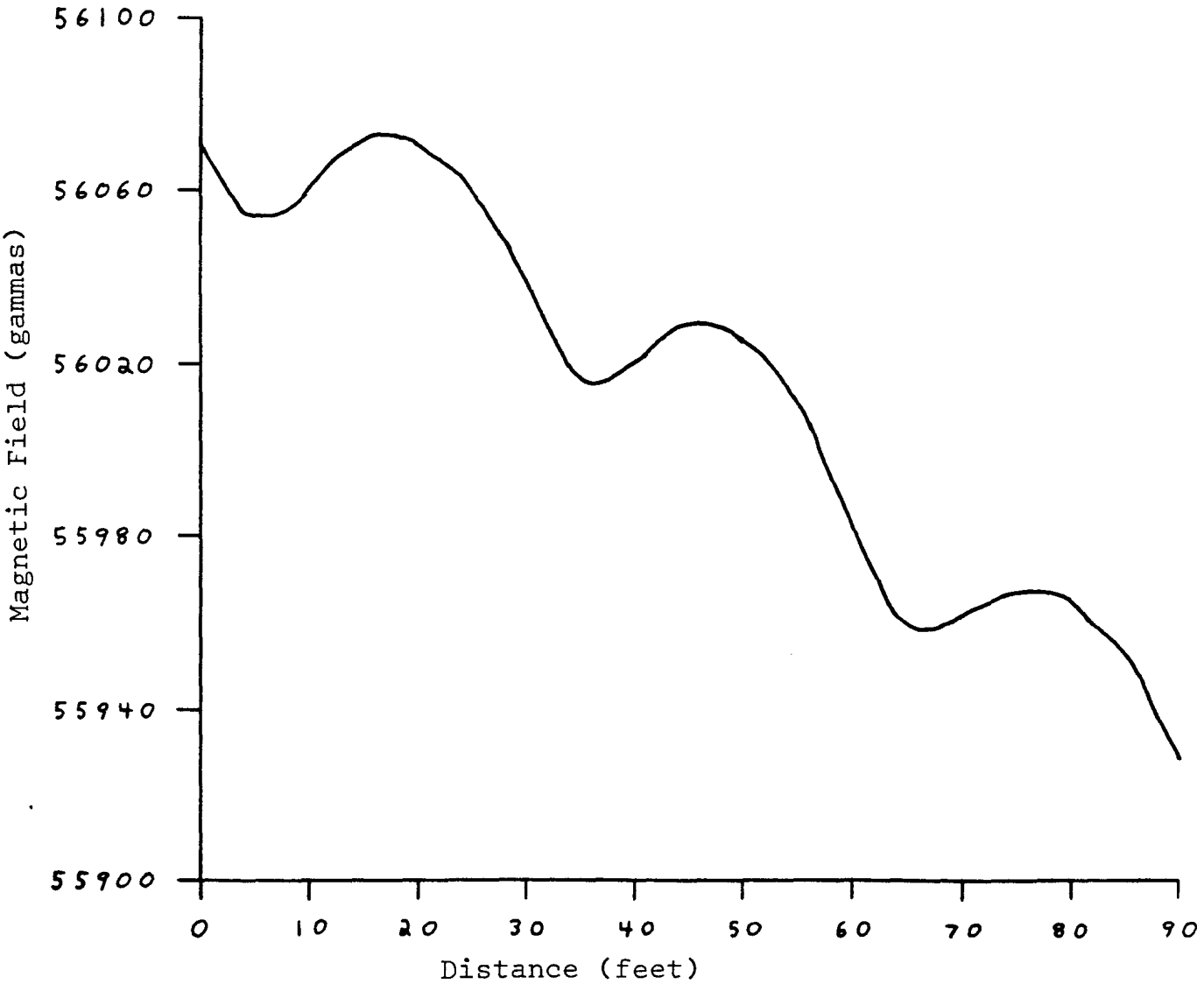


Figure 19. Magnetic profile of Row N.

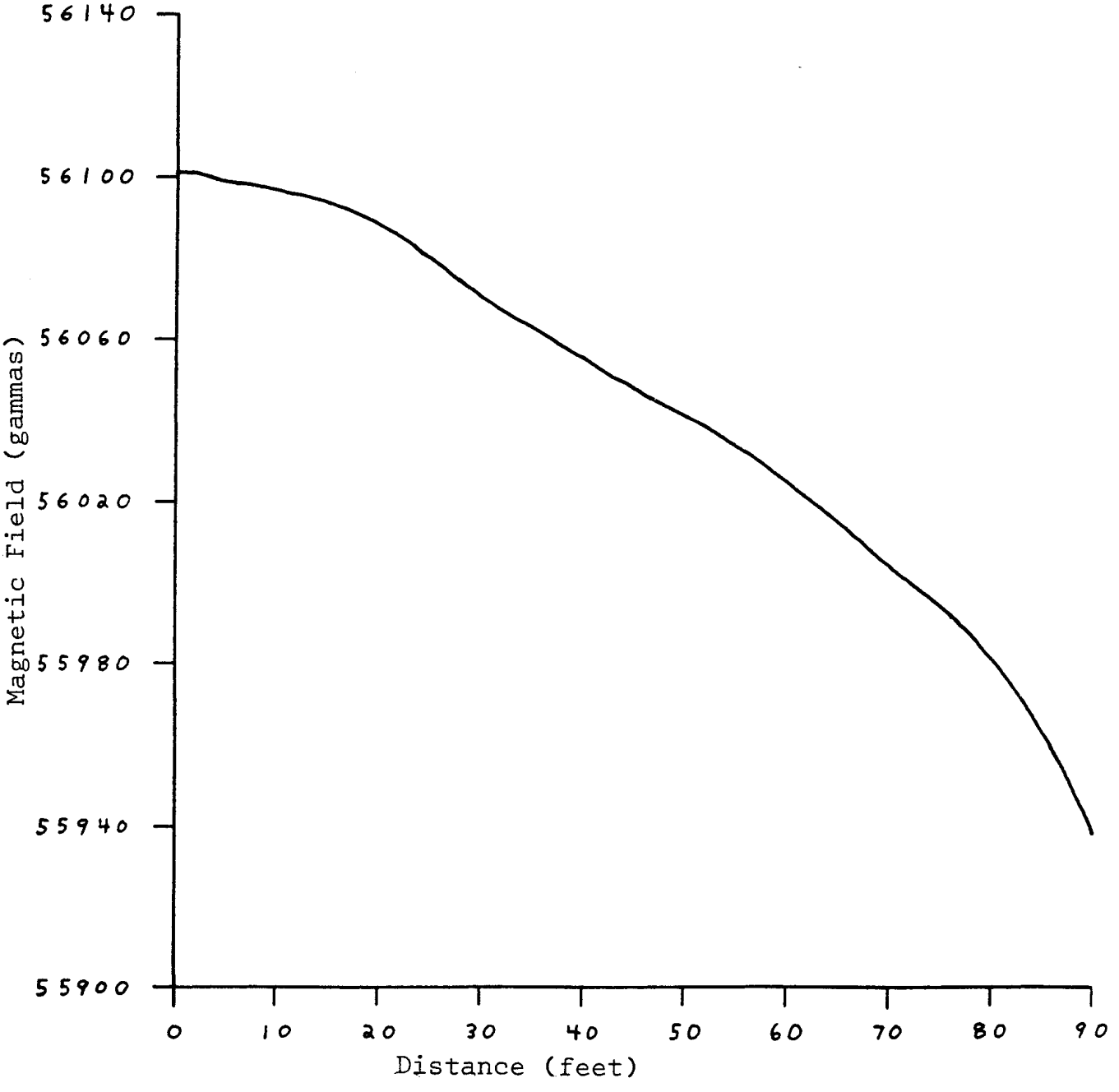


Figure 20. Magnetic profile of Row 0.

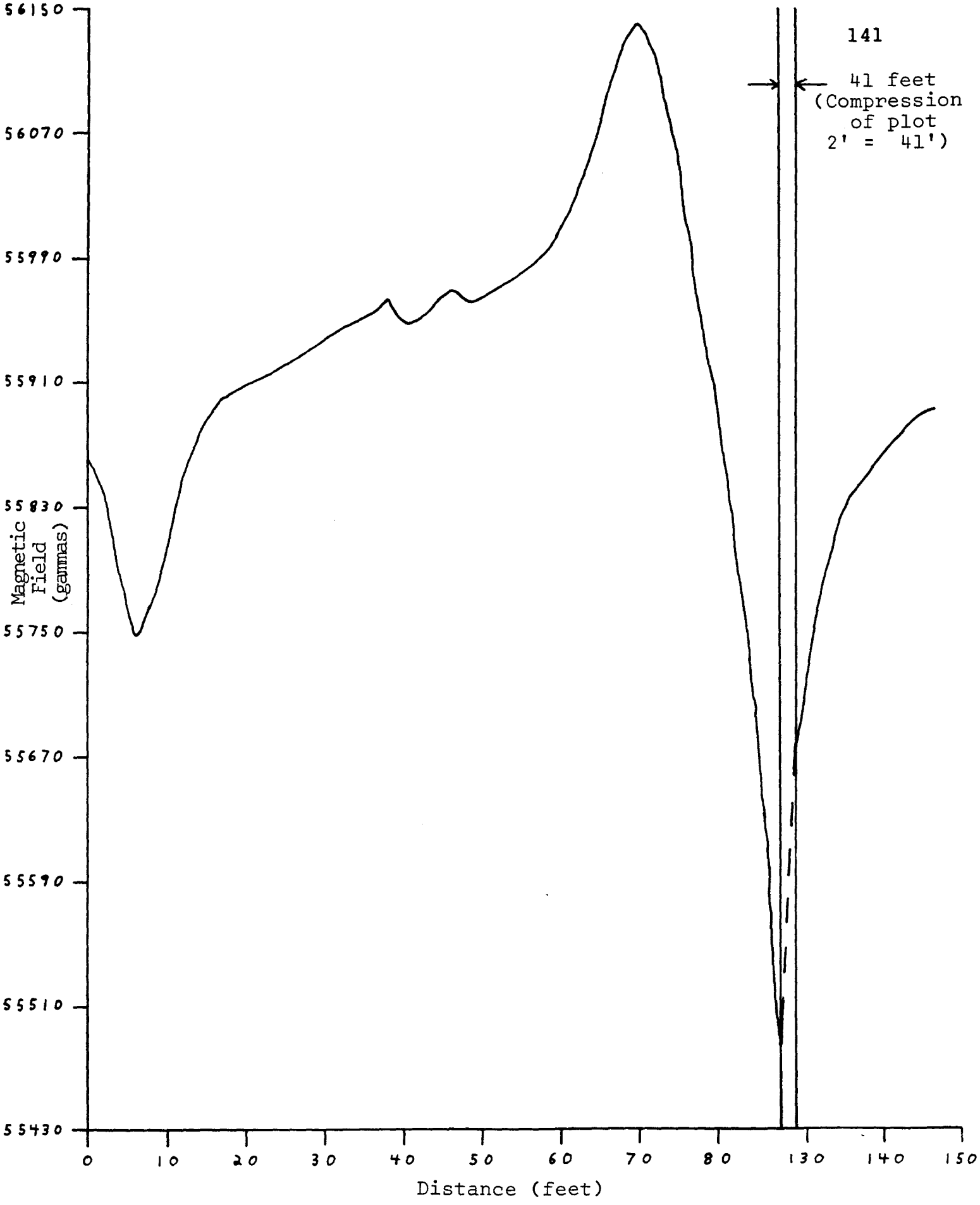


Figure 21. Magnetic profile of Row W.

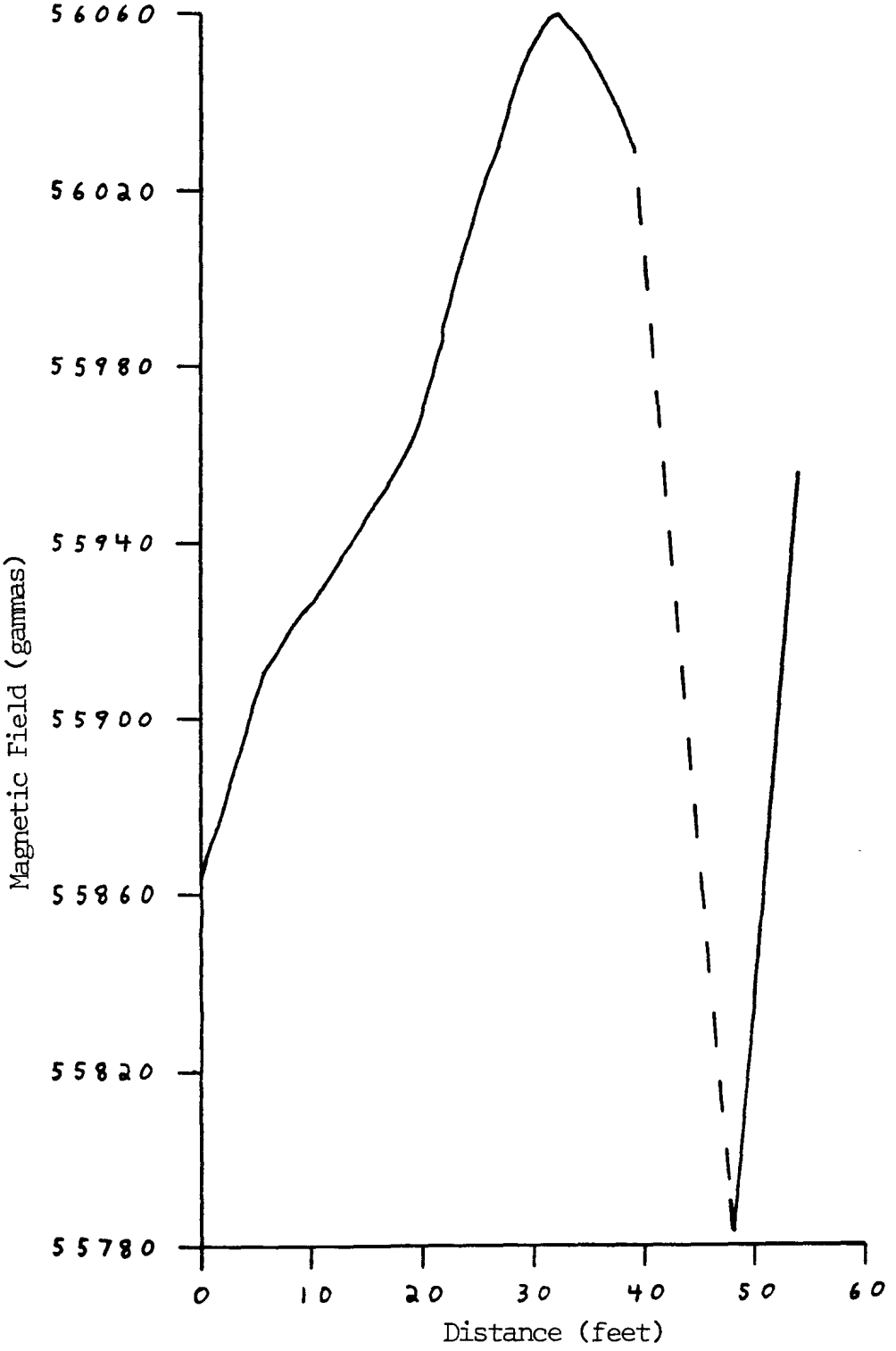


Figure 22. Magnetic profile of Column 6 in the Southern Part.

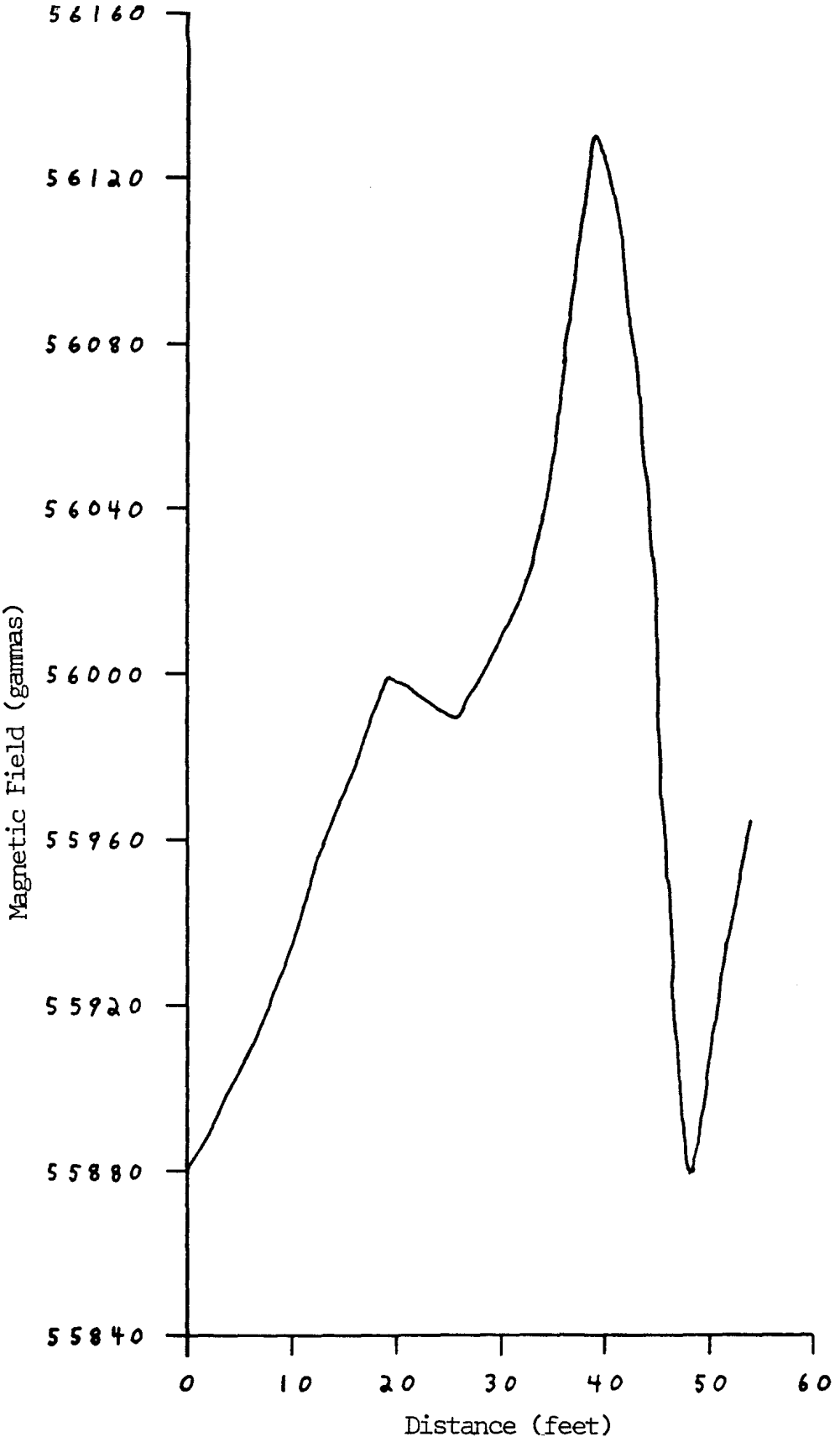


Figure 23. Magnetic profile of Column 16 in the Southern Part.

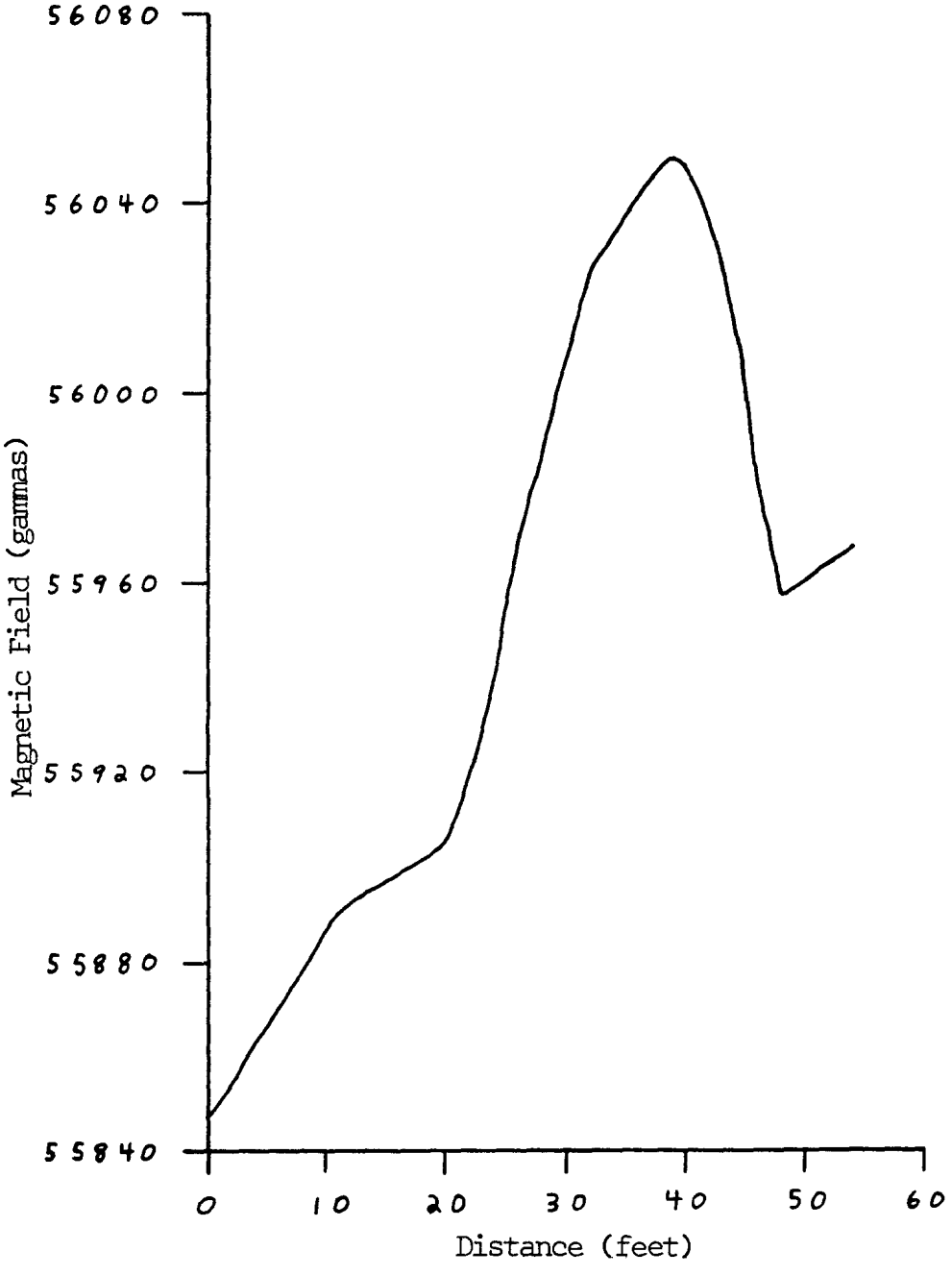


Figure 24. Magnetic profile of Column 31 in the Southern Part.

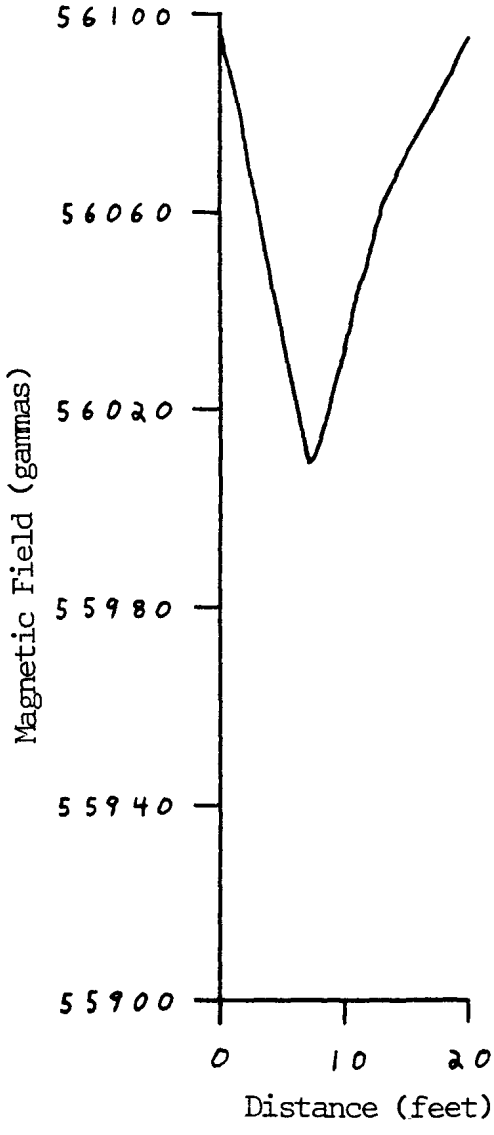


Figure 25. Magnetic profile of Column 6 in the Northern Part.

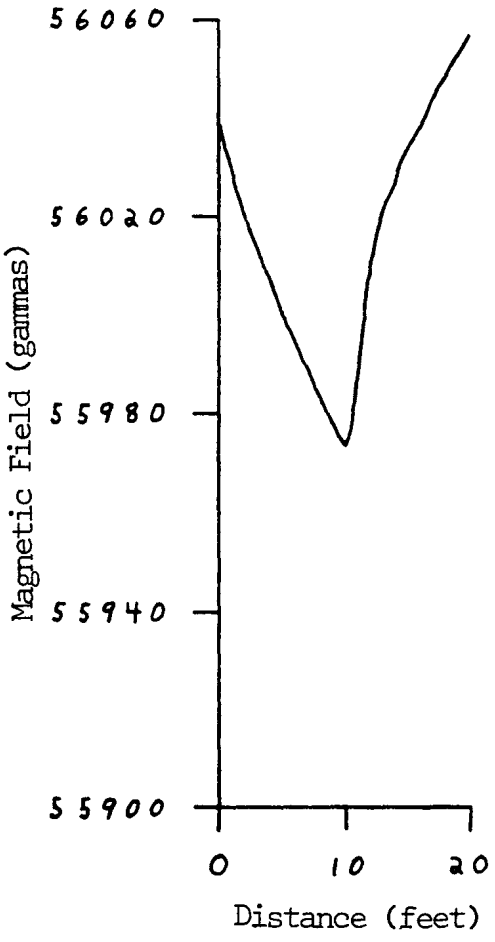


Figure 26. Magnetic profile of Column 21 in the Northern Part.

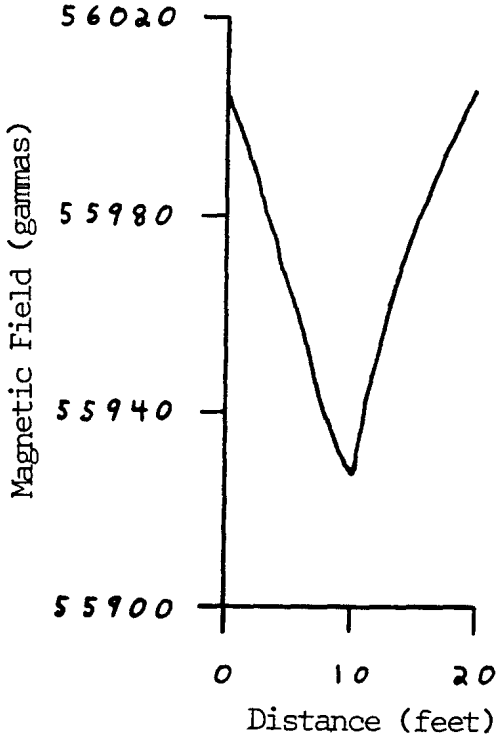


Figure 27. Magnetic profile of Column 36 in the Northern Part.

Plate 1. Total magnetic field contour map of the Southern Part, located in the field north of the Electroscience Laboratory. At five feet, six inches above the ground surface. Station Spacing is eight feet. Magnetic contour interval is 50 feet. Scale is 1:120. Datum is 56109 gammas.

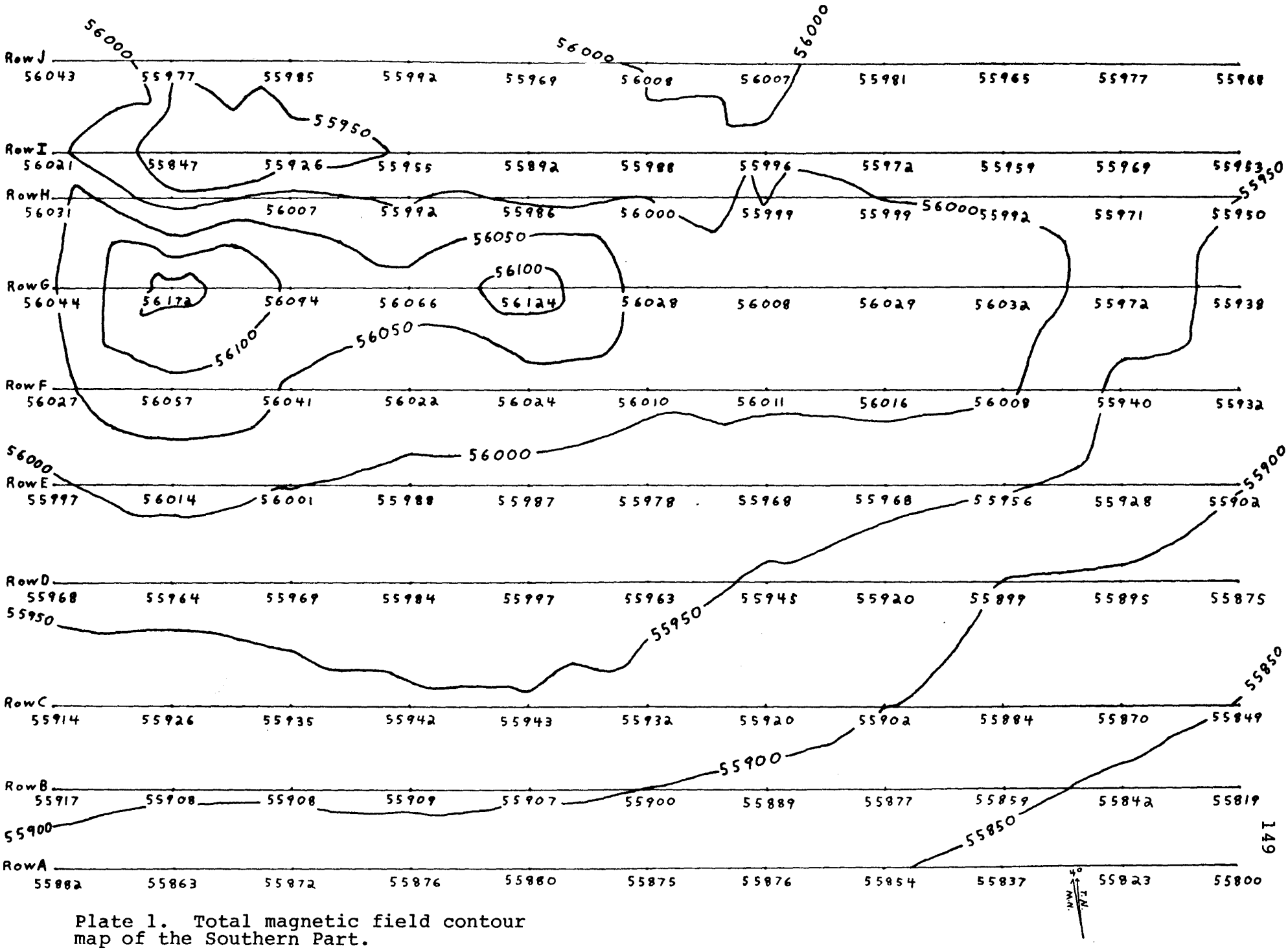


Plate 1. Total magnetic field contour map of the Southern Part.

Plate 2. Total magnetic field contour map of the Northern Part, located in the field north of the Electroscience Laboratory. At five feet, six inches above the ground surface. Station Spacing is eight feet. Magnetic contour interval is 50 feet. Scale is 1:180. Datum is 56109 gammas.

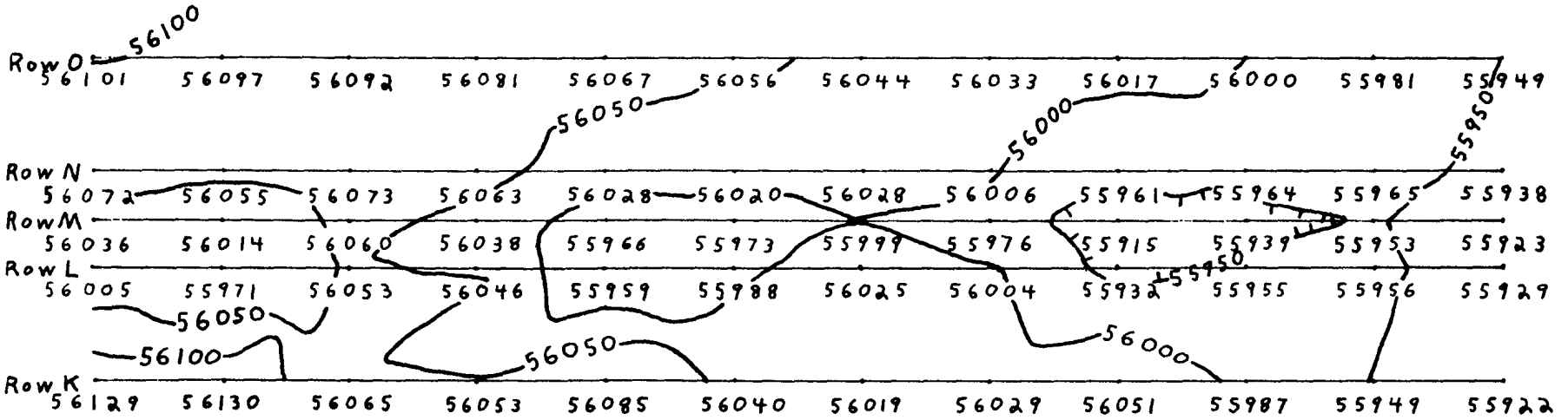


Plate 2. Total magnetic field contour map of the Northern Part.

SUMMARY AND CONCLUSIONS

A total of 165 measurements of the earth's total magnetic field intensity were recorded at the Columbia Gas Area, which was comprised of one traverse with 55 station positions.

A total of 2,010 measurements of the earth's total magnetic field intensity were recorded in the field north of the Electroscience Laboratory. This included 1,920 traverse station readings and 90 base station readings. The number of traverses made were 15. These 15 traverses were comprised of 640 station positions.

In general, the anomalys corresponded well with the sources causing the magnetic disturbances (i.e., the ferromagnetic pipes).

When the resultant vector of the magnetism of the pipes and the magnetism of the earth reinforced each other, a positive anomaly resulted. When the resultant vector of the magnetism of the pipes and that of the earth magnetism opposed each other a negative anomaly resulted. When the magnetic lines of force of the pipes were perpendicular to the direction of the earth's magnetic field, no anomaly resulted.

The proton precession magnetometer was used to measure the magnitude of the resultant vector of the earth's magnetic field and the magnetic field of the ferromagnetic

pipes.

The magnetometer cannot distinguish between different sources which could result in a given set of magnetic field readings, therefore the magnetic anomalys caused by the ferromagnetic pipes, in this survey, could be used as models for more complex structures such as anticlines or dikes.

The geomagnetic field is subject to numerous and constant changes with time. These time variations were eliminated in this magnetic survey by reducing the data. This was done in order that the total magnetic field intensity variations would be caused solely by the spatial changes in earth's magnetic field as a result of the magnetic disburbances caused by the ferromagnetic pipes.

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